Industrial mathematics in Poland - the past, the present, the future

Marta Zagórowska, dr Piotr Zioło,
Industrial mathematics or applied mathematics?
And the difference is...
And the difference is...
The past...
RAND Corporation

- Established in 1948
- American think-tank
- People: John von Neumann, John Nash, Harry Markowitz, Thomas Schelling, Donald Rumsfeld, Condoleezza Rice

Examples:
- MAD (Mutually Assured Destruction)
- Space research, artificial intelligence, power engineering, national security, social sciences, law
Enigma

- Różycki, Rejewski, Zygalski
- Important during World War II
The present...
European Study Groups with Industry

- First Study Group with Industry – 1968 in Oxford
- 105 study groups
- A workshop for mathematicians, engineers, physicists, etc.
- Science and business
Following the best British practices
Established in 2010 in Warsaw
Founded by "Industrial Mathematics and System Engineering" research group
Summer and winter internships for students
More than 50 projects for various companies
Participation in Study Groups – Great Britain, Denmark, Serbia, South Africa...
(Some of) our projects
Summer internship for students and Ph.D. candidates in mathematics, economy, engineering, chemistry, computer science...

Every year since 2005

Various projects – scientific and industrial
The future...
The beginning of a new era?

Crowdfunding

KICKSTARTER

MARS ONE
The beginning of a new era?

Crowdfunding

Kickstarter

Crowdsourcing

Facebook

WordPress

Wikipedia
Croudsourcing

- Francis Galton’s experiment on cattle market – first prediction

- Now – everyone can contribute
Prediction markets

- Speculative markets created for the purpose of making predictions
- Current market prices can then be interpreted as predictions of the probability of the event – the decision is binary YES/NO
Prediction markets

- Speculative markets created for the purpose of making predictions
- Current market prices can then be interpreted as predictions of the probability of the event – the decision is binary YES/NO
- Example – will Bronisław Komorowski win the presidential election in Poland in 2015?
L.E.M. nano

- First polish prediction market
- Industrial Development Agency & CIAMSE
- Problems – nanotechnology, graphene, disruptive technologies

www.lem-nano.pl
L.E.M. nano - mechanism

- Users predict if the statement is true by giving points (1-99)
- Number of points = the probability the statement is true/false
- Complementary predictions are paired – the winner gets 100 points
Will there be a prototype of graphene filament that can be used in 3D printing?
Will there be a prototype of graphene filament that can be used in 3D printing?

- User 1 – yes, 80% it will be true – 80 points **YES**
L.E.M. nano - example

Will there be a prototype of graphene filament that can be used in 3D printing?

- User 1 – yes, 80% it will be true – 80 points **YES**
- User 2 – no, I think for now it is not possible, but maybe... – 20 points **NO**
Will there be a prototype of graphene filament that can be used in 3D printing?

• User 1 – yes, 80% it will be true – 80 points YES
• User 2 – no, I think for now it is not possible, but maybe… – 20 points NO

• The decision – NO, there is no such prototype
L.E.M. nano - example

Will there be a prototype of graphene filament that can be used in 3D printing?

- User 1 – yes, 80% it will be true – 80 points **YES**
- User 2 – no, I think for now it is not possible, but maybe… – 20 points **NO**

- The decision – NO, there is no such prototype
- They get:
  - User 1 – nothing (loses 80 points)
  - User 2 – 100 points (wins 80 points)
Summary

• CIAMSE
  o Development of industrial mathematics in Poland
  o Popularization of science & mathematics
  o Various projects from many fields of interest
Summary

• CIAMSE
  o Development of industrial mathematics in Poland
  o Popularization of science & mathematics
  o Various projects from many fields of interest
• L.E.M. nano
  o First prediction market in Poland
  o Industrial Development Agency & CIAMSE
  o Nanotechnology, graphene, disruptive technologies
  o Predicting possible ways of technology development
Thank you!