Simulation Best Practise

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A project funded by
Innovate UK via KTN

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Reason

In high value-added manufacturing the use of simulation promises high payback.

However, there are many challenges for companies in order to exploit the use of simulation to its fullest.

Try to facilitate users in their quest to achieve more efficiency savings and competitive advantages in their design and manufacturing activities.

"For the best return on your money, pour your purse into your head"
— Benjamin Franklin

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Objective

- enable new and struggling simulation users
  to learn from experienced users   …in sector
  …from other sectors

What do I need to learn?
How can I learn it?
Is sector knowledge available?
Is there knowledge in other sectors?

Future state

Good simulation knowledge
(experienced users)

Current state

Little simulation knowledge
(new users)

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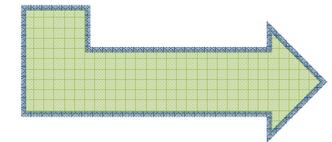
Objective

- identify future requirements so that experienced users can progress in using these tools   …in sector
    …from other sectors
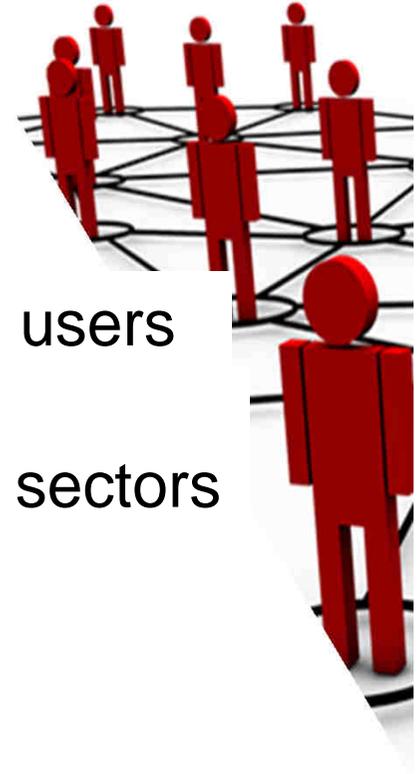
What do I need to learn?
How can I learn it?
Is sector knowledge available?
Is there knowledge in other sectors?

Future state

Solve the key challenges

Current state

Good simulation knowledge
(experienced users)

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Deliverables

- Define areas where new users can learn from experienced ones,

- Define learning areas across sectors,

- Define areas requiring further development to maintain the continual progress of experienced users,

- Create material and packages to encourage the learning process in using simulation:
NAFEMS *"State-of-Practice", "How to…", "Why do…", case studies, courses*

"I am always doing that which I cannot do, in order that I may learn how to do it."
— Pablo Picasso

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Sectors

INDUSTRY (Best Practice, Future needs)		RESEARCH (State-of-the-Art)
	Energy	
	Automotive	
	Built Environment	
	Health	
	Aeronautics	
	Process	
	Electronics	
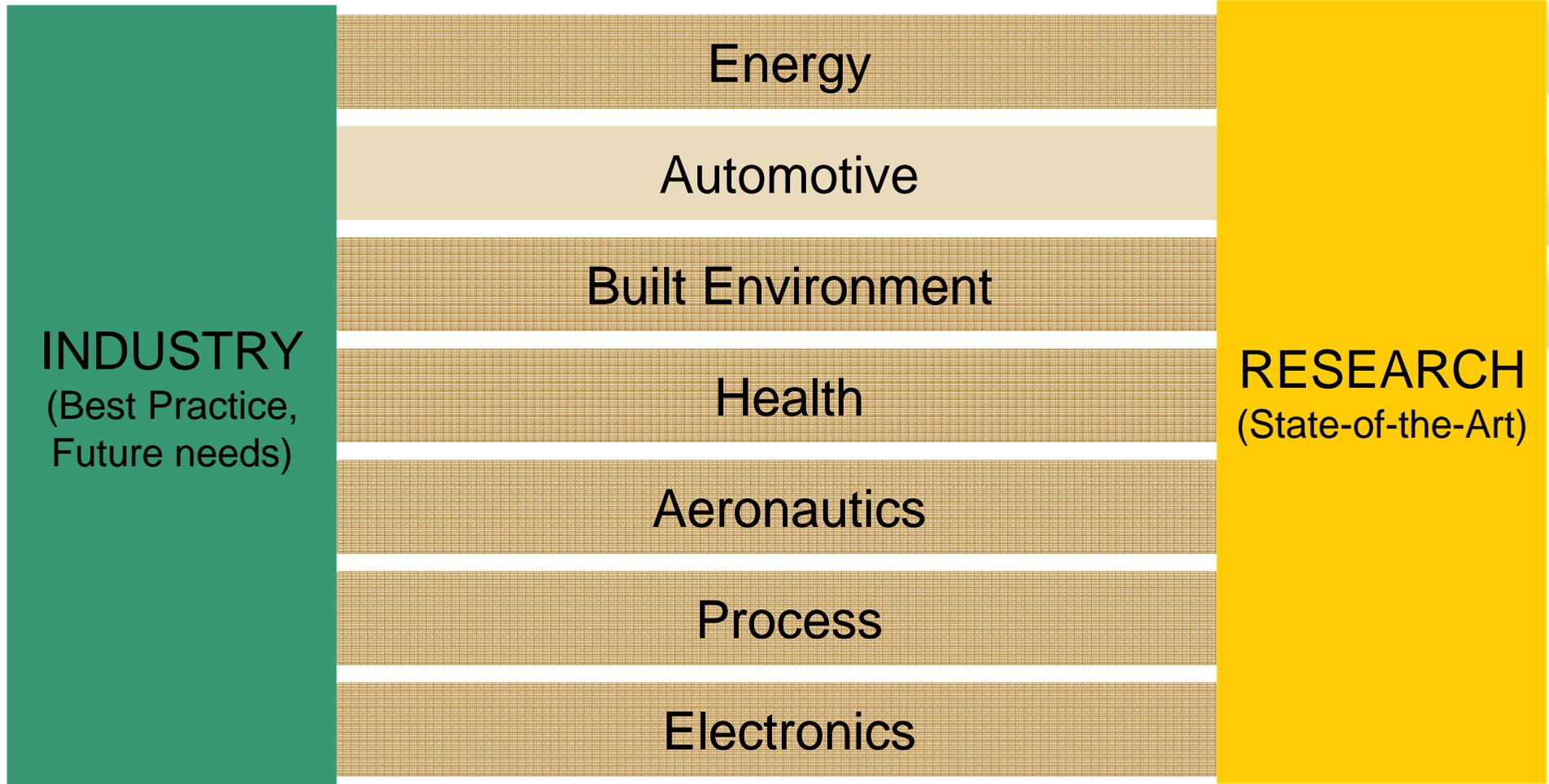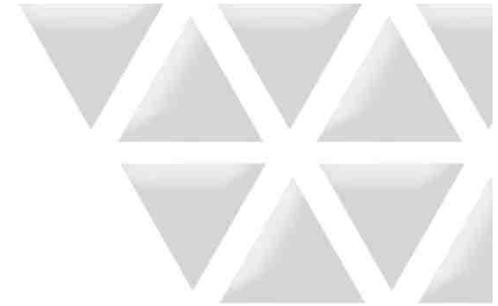
Technical Topics (all sectors)

Material technologies
Material combinations such as laminar or other composites (e.g. concrete), cracking, fatigue, new alloys, etc.

Coupled & Multi-physics
Multi-disciplinary coupled simulation or multi-physics simulation.

Multi-scale
The integration of detailed models of a wide range of scales (e.g. micro-macro, 1D-2D-3D, detailed+simplistic, etc.)

Optimization
Obtaining the best value using an automatic methodology employing mathematic and computational tools and methods.

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Technical Topics (all sectors)

High Performance Computing (HPC)
Use of supercomputers, parallel computer hardware and software, cloud computing, etc. to improve simulation throughput and speed.

Uncertainty Quantification (UQ)
Concerns taking into account the numerous uncertainties affecting the behaviour of physical systems.

Verification & Validation (V&V)
The technologies of determining and quantifying the level of confidence of computer simulation predictions.

Simulation Process & Data Management (SPDM)
Technologies and methods to ensure that our knowledge, processes, tools and corporate culture are best placed to take advantage of simulation technology.

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How?

- **Industrial survey** of 15-20 companies in *each sector*
  - Confirm the key challenges
  - Determine 'best practice' & mature technologies
  - Determine future needs

- **Academic survey**
  - Determine state-of-the-art
  - Determine sectorial trends and similarities

- **Workshops**
  - Industrial + Academic discussion sessions

- **Evaluation and Gap analysis**

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Who?
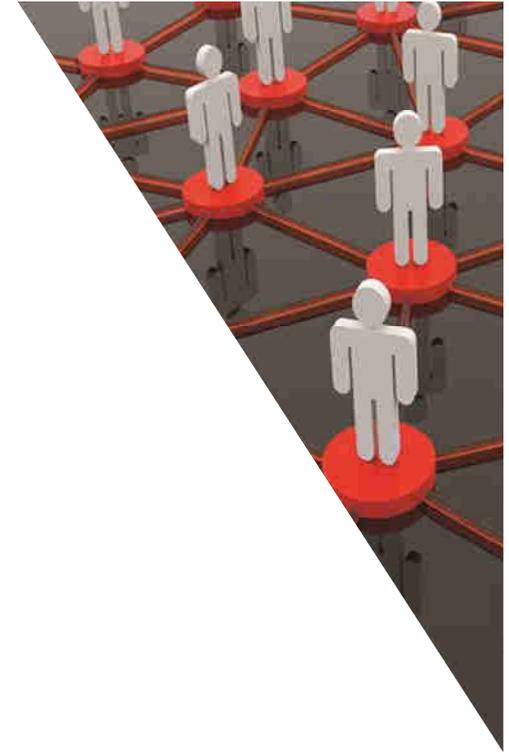
- Partners:
  - **KTN**
    - Arrange Workshops
    - Define "state-of-the-art"
  - **NAFEMS**
    - Subcontract 6 **consultant Experts** (one for each sector) for survey
    - Define industrial "best practice" and "future needs"
  - **Alstom Power**
    - Project promoter, general management, results evaluation and mentor
   - Consultant Expert for Energy sector
- Funding:
  - **Innovate UK**

Sector Experts

Energy	**Nadir Ince**	**Alstom Power**
Automotive	**Trevor Dutton** Matt Hieatt	**Dutton Simulation**
Built Environment	**Chris Down** David Deakin	**Wilde Analysis**
Health	**Rebecca Bryan** Philippe Young	**Simpleware**
Aeronautics	**Chris Morton**	**Organel**
Process	**Simon Rees** Chris Robinson	**MMI Engineering**
Electronics	**Dave Ellis** Luigi Cordani	**IDAC**

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Roadmap

Apr.
2015

Jun
2015

Sep.
2015

Dec.
2015

Mar.
2016

01/04/2015 Project start

31/03/2016 Project end

Prepare

Internal Meeting
Internal Meeting
Internal Meeting
Internal Meeting
Internal Meeting
Internal Meeting
Internal Meeting
Internal Meeting
Internal M

Interview

Evaluate

Report

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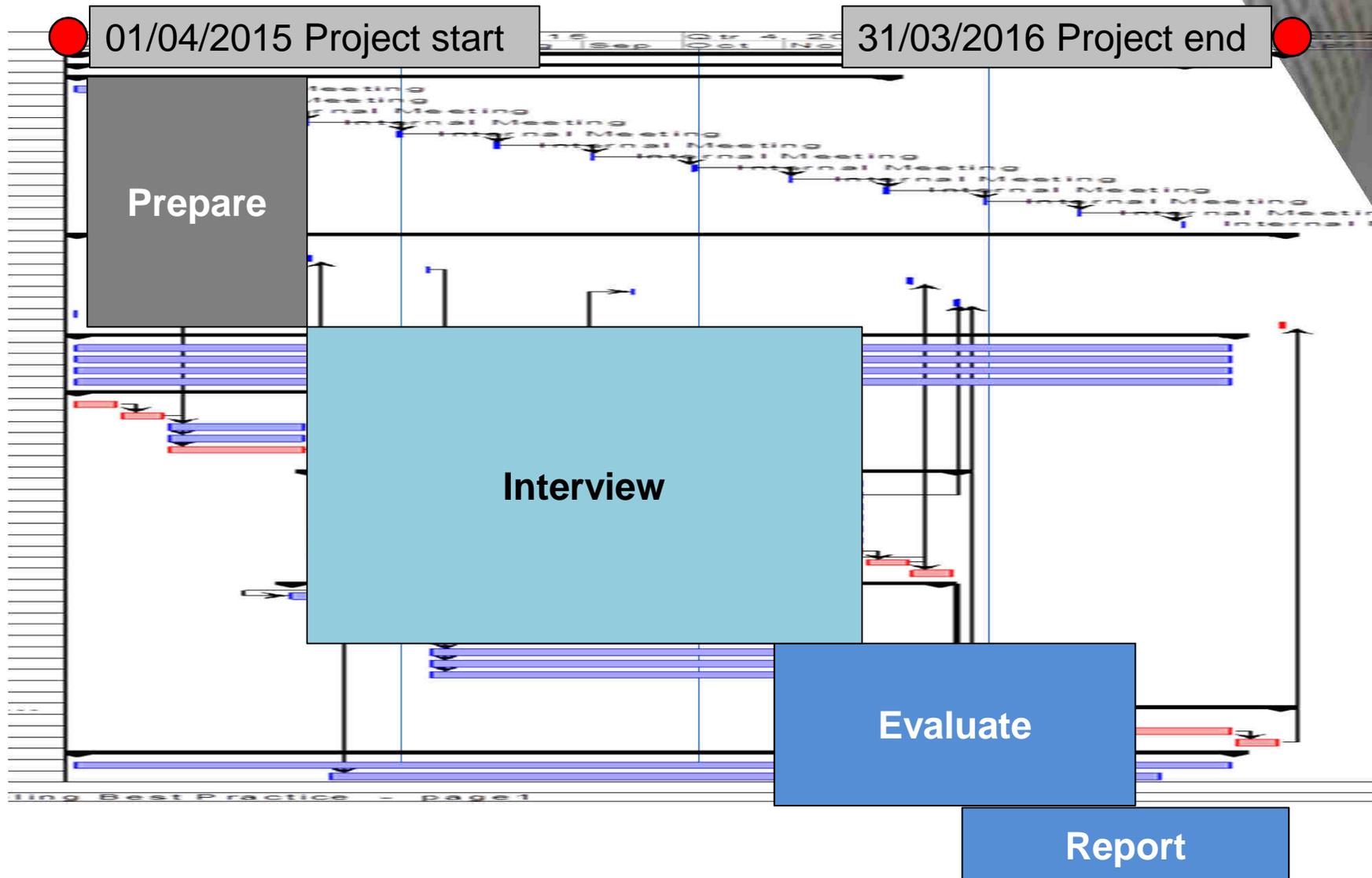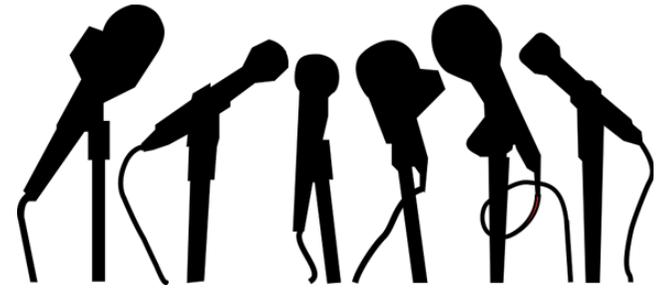
Interviews

- Terms of Engagement document to be signed
- Interviews held under the Chatham House Rule

  www.chathamhouse.org

  *When a meeting, or part thereof, is held under the **Chatham House Rule**, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed.*

- We would like to know:
  - What your company does best, methodologies, simulation tools in general, how you resolve difficulties and issues, how you maximise simulation usefulness and results, restrictions and how they are overcome, etc.
- Possible "case studies"
- About 2 hours

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Use of information
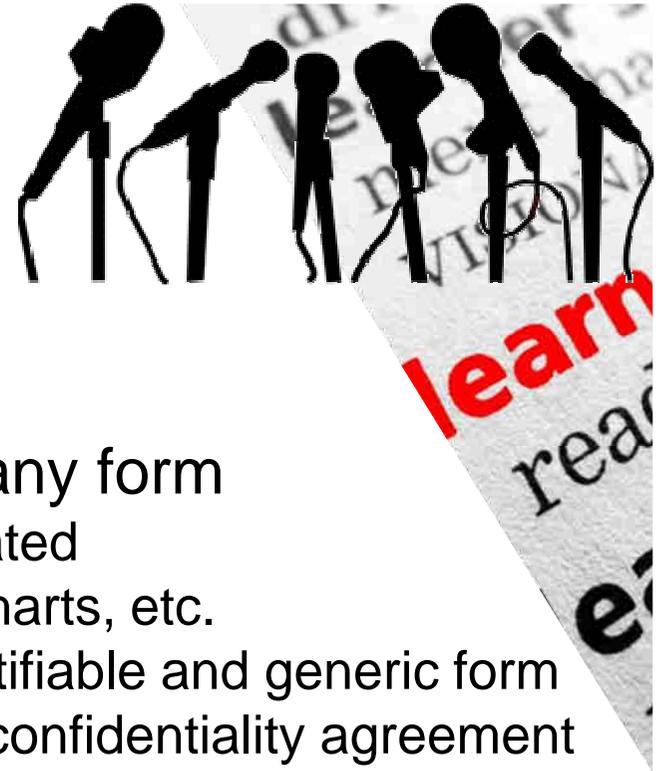
- Information discussed and obtained in any form
  - no confidential information will be disseminated
  - generalised into survey evaluation tables, charts, etc.
  - specific information will be used in non-identifiable and generic form
  - KTN, NAFEMS and Experts have a signed confidentiality agreement
  - possibly no identifiable information higher than NAFEMS

- Case studies
  - to demonstrate specific good practice examples
  - used by signed agreement
  - Expert and NAFEMS can help to remove confidential information
  - acknowledgements to be included if required and by agreement

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Post-Interview

- Project findings will be supplied
  - can benchmark your company
  - possibility of Expert coming to discuss

- Dissemination event in March 2016
  - present project findings
  - small group discussions with like-minded progressive companies

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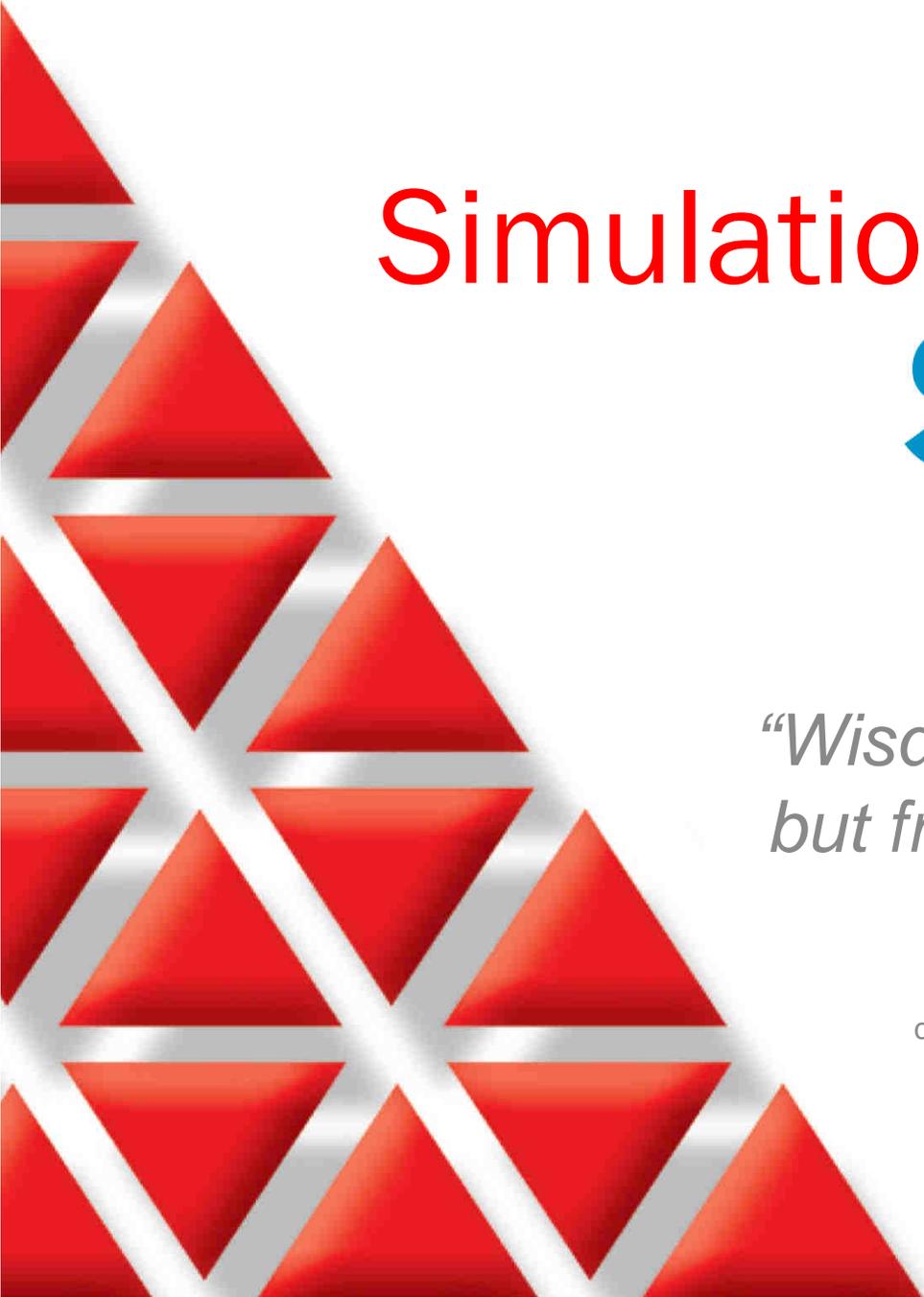
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*"Wisdom…. comes not from age,
but from education and learning"*

— Anton Chekhov

(Russian physician, playwright and author
considered to be among the greatest writers of short stories ever)

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