

WHAT IS THE DESIGN CHALLENGE?

Institution of
**MECHANICAL
ENGINEERS**

Welcome Webinar

Wednesday 25th February 2026

13:00-14:00 GMT

EvoLito
The Power of Electric Flight

EUR ING Davide Migliorini D Migliorini CEng
FIMechE

Evolito Senior Lead Engineer

Improving the world through engineering



IMECHE DESIGN CHALLENGE STEERING COMMITTEE



Davide Migliorini
Chair



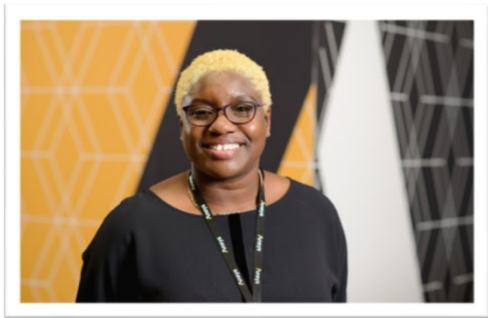
Matt Lister
Head Judge



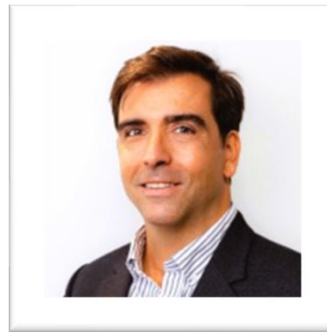
David Ball
Founder



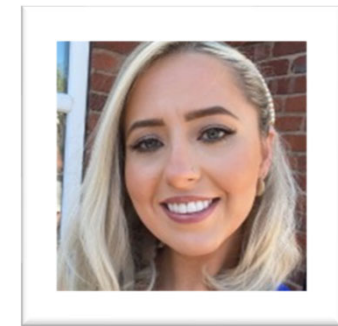
Dave Terry
RSB Member



Bridget Ogwezi
Industry Liaison, Ansys



Diogo Montalvao
Academic Representative



Olivia Evans-Walcott
Event Operations Project Lead

Forward questions to: designchallenge@imeche.org

WHAT IS THE IMECHE DESIGN CHALLENGE?

It is a competition where students design, present and build a device to perform a repeatable mission, within a real-world scenario. Website -

<https://www.imechedesignchallenge.org/competitions/>

For 2026 the scope is to simulate an autonomous wire rope climbing robot.

Teams of 3 to 6 students will face other teams in local selection, regional finals and eventually in the National Final 9th October 2026 at IMechE HQ

The competition is based around the following elements:

- Design 10%
- Poster 10%
- Presentation 10%,
- Peer review or Design Excellence 10%
- Physical competition 40%.

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DESIGN CHALLENGE 2024 NATIONAL FINAL



HOW DO THE STUDENTS BENEFIT?

- Students face a “real world project” with requirements such as, design activities and project management tasks, time and budget constraints.
- Students need to choose what to aim for and prioritise: the task and element may be bigger than the time or budget allowed.
- It tests the students’ ability to work as a team and perform cross- functional activities.
- It stimulates ingenuity and creativity, too often not considered as core skills of a good engineer.
- Students need to exercise good communication skills.



REGULATIONS / PROJECT SPECIFICATION

- To simulate real engineering codes and standards, each entry must comply with a combination of regulations and customer requirements.
- For the Design Challenge these are formed of two documents:
 - [2026 General Specification](#)
 - [2026 Project Specification and Rules](#)
- All the competing students should read and understand these two documents which are on the IMechE Design Challenge website.
- The judges score each element of the challenge based on rules compliance.
- The specifications provide a guide as to how to score well.

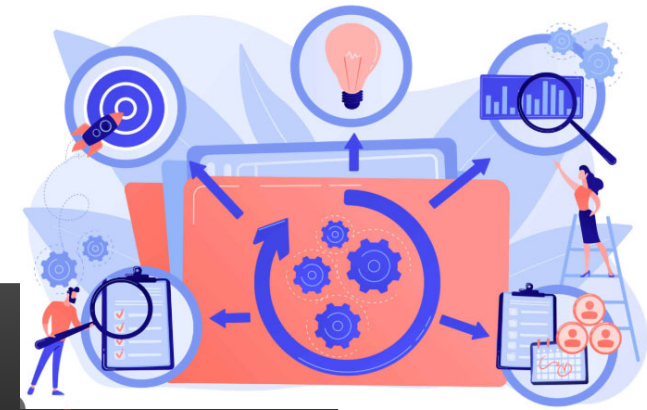
WHAT ARE THE THREE CATEGORIES?

- The 3 competing categories for the Design Challenge are:
 - **Concept:** design, planning, performance calculation, without a physical build and prototype. The design should be based only on first principle mechanical and electric components, with no code / software programmable electronics allowed.
 - **Foundation:** design and present activities as per the Concept category, followed by building a physical prototype to comply with real world performance. The design should be based only on first principle mechanical and electric components, with no code / software programmable electronics allowed.
 - **Advanced:** design and present activities as per the Advanced category, followed by building a physical prototype to comply with real world performance. This category has a more complex mission and a larger budget: code / software programmable electronics are allowed.

HOW TO ORGANISE YOUR TIME?

A suggested time breakdown is provided below. Be mindful to organise your project and the time you allocate to each area carefully, so that you can complete entry submissions in accordance with the rules!

- **5%** - review the regulations and allocate tasks / roles to team members
- **15%** - brainstorm concept ideas
- **30%** - mature concept to design, align the BoM, calculate performances
- **15%** - build and re-run the CAD & BoM (to ensure they reflect your finished product)
- **25%** - test, validate, improve, sign off
- **10%** - prepare final presentation

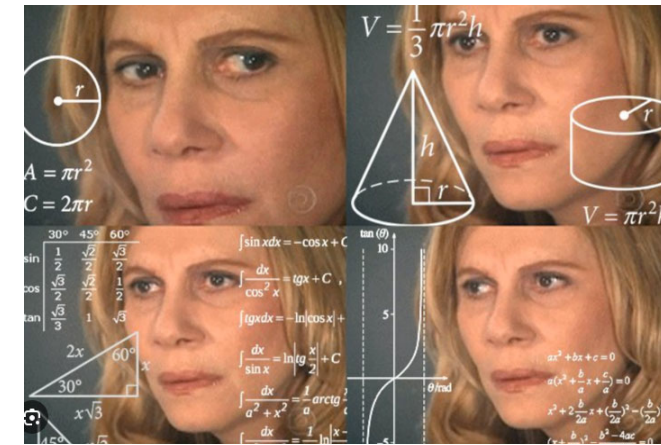


Finished Product

N.B. The IMECHE Design Challenge is not a full-time activity – make sure you budget your time carefully to complement your other academic commitments.

WHERE DO I START? THE POWER OF MAKING AN ASSUMPTION:

Performance of the vehicle is key: it is needed to perform initial calculation and process; results shall be summarised in poster and presentation. How can I start without a CAD model? Let's go back to the basic principles:



- 1) Each physical device has a mass: start with a reasonable assumption.
- 2) You need energy is required to make the mass climb, with the increasing load attached. Calculate an initial mission speed profile.
- 3) What are load and torque transfer on the pipe? Make an assumption and develop calculations.
- 4) Data are now available (torque, speed, rotational speed) for a preliminary motion system selection.
- 5) Cad can be iterated: if design and materials are correct, it will return a more accurate mass value.
- 6) Update calculations, verify selection of component, mature the loop and decide when it's time to stop and build.

HOW SHOULD I BUILD? WHAT SHOULD I TEST?

The physical build is a fundamental stage, however as it's usually the final stage, please ensure to rectify any changes before hand .

You should try to design on a risk priority basis, i.e:

- Can you simulate virtually, with basic principles calculations or with CAD exercises? = Risk is designed out.
- Conversely, are you consuming too much time in designing or understanding the problem virtually? = Better to make a note, plan time and use the prototype to understand and test.

Build – a test development cycle is recommended to de-risk solutions, perform planned fix – development stages, identify weaknesses in terms of durability or robustness.

If you have time and budget left, think about improvements via another loop of design – build – test.

(Applicable to Foundation and Advanced categories only)

KEY ENGINEERING LEARNINGS

- Problem Solving: either through design, simulation, or prototype build and test.
- How to use assumptions in early, concept design.
- Risk management – balancing time against risk.
- Design into detail, if possible, review design against mission and initial assumptions. Is the mass now different? Are we still clear on what is the project goal? Can we de prioritise or de scope something? Has the mass changed? Is the performance still sufficient? Are the dimensions different? Is the BoM aligned with the CAD and the prototype?
- Engineering concepts: verification and validation.
- Execution: design for durability and for robustness.



HOW DOES THE BOM HELP ME?

BoM stands for Bill of Material. It is the list of components and items, parts of the competing device, that in one way or another shall be considered, designed, understood, assembled.

- ? Why? → Either as bespoke designed part or as bought off the shelf item
- ? How? → If they are in CAD, the CAD software may help in creating directly a table.
- ? What? → "IMechE Design Challenge - General Specification 2026" in 6.9 to 6.25 explains.
- ? Where? → "IMechE Design Challenge - General Specification 2026" in Appendix 1 give structured BoM examples and summaries, in line with the other rules.



SUBMISSIONS AND PENALTIES

All the files as requested, including the sponsor award submission, shall be uploaded in the data repository area Mashoom maximum 1 week before the event date, see “IMechE Design Challenge - General Specification 2026” section 1.1.7 and 1.2.

What are the penalties?

Late submissions and design over budget will be considered as an unfair advantage. Disqualification and penalties are detailed in “IMechE Design Challenge - General Specification 2026” sections 15.15 to 15.28 and “IMechE Design Challenge – Project Specification and Rules 2026” sections 7.12 to 7.18.

We won a section of the Challenge, but we didn't get the overall winner. Why?

Multiple reasons: other teams overall scored more points across all the competition elements, the team did not have a valid entry in all the preliminary sections required, does not have valid entry in mandatory elements of the Challenge, see “IMechE Design Challenge - General Specification 2026” section 1.5 and 15.1.

CONCERNS RAISED PREVIOUSLY: WHAT WE DID?

- “We have a question, and some other teams may have others. We don’t have visibility on answers!”

The IMechE will upload all the questions raised to designchallenge@imeche.org on the dedicated section of the Design Challenge website and made the answer visible to all teams.

- “The documentation is too long!”

Since 2020 the body of regulations has been constantly reviewed, streamlined, simplified and clarified. It should take less than 40 minutes per document to be read.

- “It’s still too much... how can we get more help?”

Try to use AI to get help through the documentation, highlight important sections, extract data. Try always to cross check the answers against the released documents, as they are the ones used for scoring!

CONTACT DETAILS

Please email The Design Challenge judges for technical and rules-based queries only: dcjudges@imeche.org

For anything else to do with the competition such as team changes or registration questions please email designchallenge@imeche.org

Please check the Design Challenge [FAQs](#) page for any queries

NEXT STEPS

- Introduction to your regional chair
- Regional Final dates to be communicated

Upcoming Webinars:

- Get Ready for the Regionals – Project Management and CAD – Wednesday 4th March
- Get Ready for the Regionals – How do I win? - Wednesday 11th March 2026
- Let's move from the regional winners to the national winners! - Thursday 11th June 2026
- Get Ready for the Design Challenge National Finals – Wednesday 2nd September 2026

QUESTION TIME

THANK YOU.

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THE DESIGN CHALLENGE IS A COMPETITION TO ENJOY!

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