

Minutes – Engineering Division IAB Meeting – 2nd March 2017

Participants Internal: Kaspar Althoefer, Jens Müller (JDM), Eldad Avital, Ettore Barbieri, Vassili Toropov (VT), Fariborz Motallebi (FM) & Pihua Wang.
MEng Numerical Optimisation project students: Adenrele Balogun, Hiwad Nasimi, Ahmed Osman, Jordan Owens, Rohan Poudel, Girichandran Rajendran

Participants External:

Carren Holden, Airbus
Royston Jones, Altair
Zulshan Mahmood, Ford
Richard Smith, Winchester Consulting
Christine Hannon – Rolls Royce
Mark Jiskoot, Cameron-Schlumberger

Apologies – John Stark (QMUL)

Graham Deacon (Ocado)
Paolo Bianco (Airbus)
Rich Walker (Shadow Robot Company)

1. Minutes of previous meeting

Accepted and approved

2. Updates of Research Activities (led by KAA)

Dr. Botto has been awarded a prestigious European Research Council 5 year fellowship.

Dr. Li was awarded a large EPSRC grant on the launch and recovery of boats.

Dr. Mueller has been awarded funding for a Special Interest Group (SIG) on “Numerical Optimisation” within the EPSRC-funded UK Fluids Group.

Dr. Castrejon-Pita is a partner in a SIG on “Drop dynamics”.

Dr. Karabsov is a partner in a SIG on “Multi-scale modelling”.

3. Overview of Staffing Changes (led by VT)

There have been three new recent appointments:

Prof Xi Jiang from Lancaster working on sustainable and cleaner energy utilisation.

Dr Jun Chen from University of Lincoln working on the interface of Operational Research and Control Engineering

Dr Andrew Buchan from Imperial College working on modelling multi-phase fluid flow modelling primarily in nuclear engineering.

There are in addition 2 new lectureship posts to replace a professor and a reader who have recently left QMUL.

4. MEng Project Review (MEng group)

MEng students of the Numerical Optimisation team supervised by J-D. Müller (JDM) and V. Toropov (VT) presented the advances with their project, following on from

their initial presentation at the November IAB. IAB member suggested to the students to include more technical background, as a number of IAB members were optimization experts. However, the students had been told to stick to a strict time limit for their presentation, which did not allow to cover much detail for the wide range of cases the team is considering.

5. Overview of Industrial Interaction through Student Projects

A document was circulated to the group prior to the meeting that included a series of deadlines for project proposals / topic definitions.

JDM summarised the document explaining the various types of student projects at QMUL and their schedule.

It was pointed out that undergraduate and MSc projects were fully funded by SEMS, each project has a specific budget, projects with strong industrial focus requiring specialist equipment or materials may ask for co-funding.

PhD projects are typically funded under full economic costing (FEC) when sponsored by companies but for 2017 start we have negotiated for a number of part funded studentships where industrial partners on the IAB could bid for matching funding through a competitive bidding process.

JDM would prompt companies about deadlines, requesting topics and project ideas in Feb/March for BEng/MEng projects and Aug/Sep for MSc projects. IAB members were encourage to disseminate to their colleagues in their organisations the opportunities for collaboration that SEMS can offer and the timescales.

Mark Jiskoot highlighted that a 300 hour BEng project could not produce much of benefit from a company perspective.

JDM gave an example of a successful 3rd year project with Rolls Royce where the company provided optical scan data for 50 blades together with geometric CAD data. The student produced an analysis chain to evaluate the effect of geometric uncertainties on target objectives such as mass flow through the blade passage. Since the project slotted into the existing research collaboration with RR and the research expertise of the research group, the outcome was very successful and highly appreciated by RR.

Karen Holden asked whether industrialists could come in on existing project titles. JDM confirmed that this was possible, and he will note to circulate the titles of current projects to the IAB members. However, it is much more effective to be involved from the start to shape the project and motivate the students.

VT highlighted the potential of MSc student projects, which are taken by students at a higher level and which are double the hours for a 3rd year project. He indicated that these can be particularly useful for speculative projects.

5. Motivational Guest Lectures

It was noted that these are particularly important for motivating new 1st year students

Jones asked what the objective was of organising these?

JDM and colleagues pointed to a number of positive aspects: Put learning outcomes into context, motivate students by demonstrating that 'dry lectures' can teach very relevant skills, respond to student requests in NSS/QMSS, and to highlight to the students what projects are of interest to real companies.

Mahmood: asked how many guest lectures would be needed?

JDM: Indicated that a target was for a 1-hour lecture per module. Students typically take 8 modules each year.

An alternative approach was discussed where a seminar series could be offered that might be attended by students from different streams over a range of modules that might cover a broader range of aspects of industrial practice.

Guest lecture topics were offered by the following IAB members:

Holden offered talks on Loads and on optimisation

Mahmood: Engines performance modelling

Smith: Combustion modelling or Robotics

Sihler / Jiskoot: Fluid mechanics related to the O&G sector, design of fluid management systems or on the optimisation of a design for life.

Hannon: Manufacturing of engines components or modelling the manufacturing of these components

Jones: Structural optimization (linking perhaps into the design stream)

6. Division of Engineering Science Curriculum Review

JDM presented the Division of Engineering Science (DES) initiative in curriculum renewal and integration and a document was circulated to all the IAB members.

The coordination of subjects such as fluid mechanics, structures or design across the years was highlighted.

IAB input was sought to gauge industrial relevance of the current curriculum structure, with an emphasis as to whether all the essential skills required by a graduate engineer were covered.

JDM highlighted that at this time only modest changes to the curriculum for 2017/18 can be made. In essence these are small changes that do not require a module amendments. Larger changes, if necessary, require a lengthy process with approval required from Academic Registry and Council Secretariat (ARCS). This meant that substantial changes would be delayed until 2018/19 or to the next scheduled Programme Review.

Jiskoot: Enquired where are students taught materials engineering such as corrosion, protective coatings, elastomers or application of engineering materials that are used in seawater?

Barbieri indicated that students are given opportunities to learn some of these things independently or through project work.

JDM pointed out that in lectures only the basics can be taught in the available time. It was also highlighted that the needs of what we wanted to teach had to balance with the accreditation requirements.

FM explained that our priority was for students to have a good understanding of the fundamentals.

IAB members were asked to associate themselves with one or more of the subjects and contribute to the discussion of the subject review from an industrial perspective before the next IAB in the Autumn.

Jiskoot/JDM: Design for Manufacture versus Design for Life.

Hannon suggested that different companies could do lectures on the basics of different topics:

Jiskoot: Materials – Fluids

Holden: Fluids and Design

Hannon: Structural Materials, Design

Mahmood: Combustion

Jones: Design

JDM will report back at the November IAB.

Jiskoot asked what the aims of the degree programs were.

JDM explained that SEMS students covered a range of abilities, from first class MEng graduates who should be able to pursue a research track career immediately after their degree, to BEng graduates which provide the necessary skills for a successful career in industry

Richard Smith enquired about the availability of Year in Industry programmes. It was highlighted that this was possible in both BEng degrees as the 3rd year of 4 typically and in MEng degrees (as the 3rd or 4th year of 5)

Holden, Hannon & Smith all pointed to internship programmes offered by companies – they enquired about the deadlines?

Crawford Blagden was to establish contact with all the relevant IAB counterparts at the companies to highlight opportunities.

Holden asked about the diversity in the SEMS student body based on either social background or gender? – It was explained that SEMS was the highest proportion of female students of any equivalent school in the UK. This was in part a consequence of the popularity of medically related programmes which attracted female students to QMUL. Therefore more than 25% of SEMS students are female.

JDM pointed out that SEMs has Athena Swan bronze award, and that in 2017-18 we will apply for silver. This strategy has had a positive impact on equality and diversity

in the school and striving for silver mark will ensure that we continue to improve. SEMS is a member of the “Women in Engineering Society” (WES), has strong outreach activity designed to encourage female students into studying Science and Engineering.

Holden and Hannon were keen to support WES + happy to be role models – the contact in SEMS for Equality and Diversity Agenda is Núria Gavara. JDM will introduce both sides to each other.

Barbieri: informed about a direct entry scheme at SEMS where students who are predicted the best grades were invited for interview, and if their potential was confirmed then they were given an unconditional offer. EB interviewed 12 Aerospace applicants, of which 8 were female. All 8 interviewed well and all were given unconditional offers.

7. DES 'all-years' project, “Learning together” & the QMUL Model

JDM outlined the motivation behind the QMUL model. Its aim being to equip students with a broad range of transferable skills, within purpose-designed modules. While in 2017/18 Schools only needs to identify relevant content, from 2018/19 onwards specific modules will have to be offered.

Many details of the scheme are yet to be defined, so no clear examples can be provided at this stage.

JDM recounted results from recent student surveys (NSS, QMSS) where many students raise a lack of cohesion, a desire to have stronger feel of community.

JDM explained the new teaching ideas: including projects that go from 1st year to last year, meshed with staff research and offering clear academic engagement, the “Learning Together” projects. The initiative needs to fit into QMUL Model, and needs to harness staff/financial resources made available for that. But it also needs to harness the ability and motivation of higher year students to coach and mentor the lower years. Some IAB members pointed to the 'House' system in private schools.

IAB members comment very favourably on the idea, as it can address a number of issues they observe with SEMS graduates:

Jones highlighted the importance of team work / project management / interacting with peers – in a manner similar to that in industry. An example of student group in another university having developed and built an aeroplane. The SEMS engagement with Formula Student was highlighted.

Smith observed that having taught chemistry in Oxford, that private schools were able to raise the social capital of their students continually and that SEMS should aspire to do the same for our students particularly those with low social capital. There was broad agreement in the IAB that both, skills and knowledge, as well as a 'can do' attitude and strong self-belief were important to be able to succeed.

Smith recounted his experience of staff delivering transferable skills elements of the programme related to industrial practice, career management having no credibility for this role. C. Hannon and R. Smith agreed to connect DES in touch with RR staff who can deliver lectures on this at SEMS.

Specific comments by IAB members on the 'Learning Together' model:

Holden: supporting the idea of a project such as the building an aeroplane.

Jiskoot: very supportive of it as teamwork is important and that comes out of building something together.

Jones: A good engineer is a good communicator. Drive and motivation is important.

JDM: Industrial dimension is needed. Could industry support our collaborative projects?

Hannon: community projects at RR, try to give something back to community such as the development of kit-cars for schools.

Hannon: Encouraged involving school age children to come to Uni to do engineering.

JDM summarised that DES will develop these ideas further and come back to the IAB company partners.

8. Any other business

No other discussion points are raised, meeting closed at 14:55.

Minutes taken by KA 2/3/17 with additions by JDM 7/3/17.

Edited by JCB.