

Meeting of UKFN Executive Committee
1400-1600, Friday 3rd November 2023

AGENDA

1. Agree **Minutes** of last EC meeting (1/11/2021).
2. Report on **outstanding actions** from last meeting (none).
3. Discuss results of **SIG review** to determine which SIGs wish to continue.
4. Discuss **talks** and **Cassyni** subscription.
5. Report on UKFN **newsletter**.
6. Discuss UKFN **website**.
7. Update on **NFFDy**.
8. Report on **2023 UK Fluids Conference**.
9. Review **Thesis Prize** arrangements.
10. Discuss **finances** for UKFN.
11. Discuss pathways to **UKFN 2.0**.
12. Any other business.

MPJ/NCD, 31/10/2023

Item 3: Special Interest Groups

SIG Review

It was previously agreed to review the SIGs periodically, to ensure they are maintaining a reasonable level of activity. We therefore contacted the leaders of all 44 extant SIGs (22/9/2023) to ask them whether they would like to continue or retire.

- A total of 30 SIGs opted to continue. Of these, around 50% have been active on a regular basis, holding meetings and other events. A number of the SIGs found alternative sources of funding for face-to-face meetings to replace UKFN support. The other 50% have not held a meeting for a while, but are keen to restart. For those who wish to carry on, UKFN will continue to offer support through publicity of the SIG and its activities in the newsletter and on the website.
- Some 12 SIGs opted to retire. In several cases, the members formed a new group to take over from the SIG after the end of the grant, and there is therefore no need to restart the SIG. In other cases, the SIG has been formally replaced by a CCP¹ or similar. We will move these from the list of active SIGs to 'Previous SIGs' on <https://fluids.ac.uk/sig>.
- The remaining 2 SIGs have not sent a definitive response yet. We will continue to seek their preferred options.

New SIG application

An application has been received to start a new SIG on the topic 'Uncertainty quantification and data analytics in fluid mechanics'. The proposal is included here in Annex A.

■ Would the EC express their view on whether to approve the new SIG.

Item 4: Talks and Cassyni

Background

Following the rapid adoption during the pandemic of platforms such as Zoom to host – and possibly record – seminars, in September/October 2022 UKFN reviewed which institutions were running fluids seminars online and possibly recording them, with a view to expanding the 'Recorded talks' part of the [Talks page](#) to a UK-wide collection. During this review, a new platform called [Cassyni](#), developed at ICL, came to light. It was developed primarily for organising seminar series, recording the seminars and then archiving the recordings, but it could also be used to build a repository of recorded talks, with a number of advanced viewing features, as well as creation of a DOI (which means recordings are maintained in perpetuity).

Year 1

UKFN therefore bought a 1-year subscription with the objective of using it to take over from 'Recorded talks' and expand the collection with recordings from other institutions, in particular those with recordings but no capability to share them. Cassyni agreed to allow up to 20 recordings to be added to the [UKFN Series](#) from any given institution without their having to buy a separate licence.

UKFN uploaded some of Talks page recordings, and also issued an open invitation to institutions via the newsletter to contribute fluids seminar recordings to the UKFN series but none were received. The current UKFN Series on Cassyni is still a subset of the Talks page.

There is also a [UKFN Collection](#), which is being used to collate other Cassyni series with a strong fluids content.

Year 2

The subscription recently came up for renewal, so we carried out another brief review to check the current status of seminar recording among some of the 'major players' in fluids (Leeds, Manchester, Southampton, Warwick, Edinburgh, Bristol; ICL is already covered by Cassyni). The most positive responses came from Leeds, Edinburgh and Southampton, with possible interest at Bristol. Cassyni offered a renewal for the UKFN licence that included an additional three free 1-year licences for us to distribute to institutions of our choice. These have

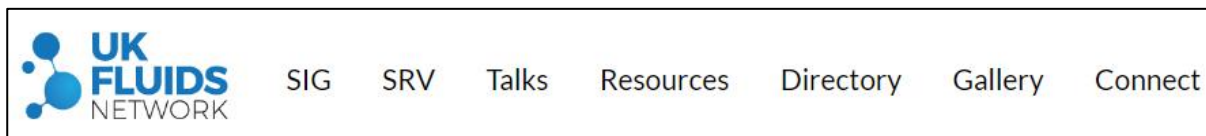
¹ Collaborative Computational Project, e.g. CCP-WSI on wave-structure interaction.

been taken up by Leeds, Edinburgh and Southampton, and Cassyni are assisting each of these with setting up their own series.

Further recordings from Cambridge are being added to the UKFN series.

Item 6: Website

With the advent of NFFDy and some funds available to update the website, it is an appropriate time to bring the content up to date with current UKFN activities and priorities.



Main menus on UKFN website

Looking at the main menus, above, these include:

- Review the [SIGs](#) and move any inactive SIGs to the 'Previous SIGs' section.
- Remove the [Short Research Visits](#) and archive the contents.
- Reduce the [Talks page](#) to recorded talks only.
- Remove the [Researcher Resources](#) section and archive the contents.
- Retain the User Directory but make the [Directory page](#) more responsive.
- Retain the Gallery but make the [Gallery page](#) more responsive.
- Add a new menu item for NFFDy.

The NFFDy Hub grant has funds to support website development by Peter Benie in the Engineering department at Cambridge. So far, he has done some background work, but has not started on the overhaul yet. This will be shaped not only by the above but also by the implementation of UKFN 2.0 (Item 11).

Input to specific plans will be welcome from the EC when these are being formulated.

■ Would the EC comment on the above general plans, in particular for the Researcher Resources.

Item 7: Update on NFFDy

Activities by the NFFDy Hub, which is coordinating the NFFDy fellowship programme, have been concerned so far with setting things up and organising and running the first Summer Programme.

Summer Programme

The first of the two six-week NFFDy Summer Programmes took place in Cambridge from 10th July to August 18th 2023 on the theme of 'Data in Fluids'. Mostly concentrated in the first two weeks, the 26 participants attended short lecture courses of 1-4 days on different data processing techniques, plus a demonstration overview of PIV at DAMTP. In the remainder of the time, they worked on projects in one of eight teams. Other activities included:

- Outreach challenge – following an 'Introduction to outreach' session with Jinx St. Leger, Outreach Officer at CUED, and Joel Sommeria, from the Encyclopaedia of the Environment, participants spent an afternoon creating outreach ideas and materials, where were presented on the final day.
- 'Meet the funders', an opportunity to engage with EPSRC's Andy Lawrence, Grace Belshaw and Chloe Harman-Weaver.
- 'Presenting data to policymakers', a session led by Rob Doubleday (Centre for Science and Policy) & Emily Shuckburgh (Cambridge Zero).
- 'Academic publishing', a Q&A session led by Anna Simpson of Cambridge University Press.
- Coffee-break talks – on most days, there were two or three 3-minute talks by participants or members of the Engineering fluids group, introducing themselves and their research.

The [NFFDy Blog](#) contains further details of these and other activities throughout the Summer Programme.

Catch-up meetings

There will be regular fortnightly Zoom meetings for the fellows at 11:00 on Fridays. These will alternate between 'problem surgery' sessions, where anyone can bring up a problem they have in their fellowship work that the others may be able to help with, short presentations by a fellow on their work. The first took place on 20/10/2023, with a problem surgery and general catch-up session.

Item 9: Thesis Prize

With the 2024 competition in mind, the current arrangements for the competition are as follows.

- **Eligibility:** The thesis is for a doctoral degree awarded by a UK institution on a fluids-related topic and examined in the previous calendar year, e.g. during 2023 for the 2024 competition.
- **Nominations:** A thesis is nominated by one examiner and seconded by the other. The nomination may be submitted at any time after examination but no later than 1st March of the competition year. The nominator is asked to focus on: *Originality* | *Contribution to the subject area* | *Breadth of knowledge* | *Elegance of presentation*.
- **Publicity:** The competition is formally launched at the start of the competition year, with a closing date for nominations of 1st March. It is advertised in the UKFN newsletter and through the institutional points of contact. The [Connect page](#) also has a resident description of the prize and nomination procedure.
- **Review:** The shortlist is reviewed by the EC only. There are 3 reviews per thesis, distributed by MJ/ND to match up as far as possible the thesis topic with the reviewer's research area. The nominations and theses are anonymised as far as possible. Review criteria are: *quality of the scientific contribution of the thesis* (two-thirds) | *rigour of the presentation* (one-third).
- **Winner:** The result is announced within 2 months. The winner is awarded £500 and invited to present their thesis work in a plenary session at that year's UKFC. Their travel and accommodation are paid for by UKFN (NFFDy Hub).

Would the EC comment on whether any of these should be changed, in particular widening publicity, broadening the pool of reviewers and revising the review criteria.

Item 10: Finances

Although the UKFN grant ended in February 2020, there may be scope for some small-scale funding of UKFN-related activities from the NFFDy Hub grant, e.g. a few £K to facilitate meetings. The NFFDy Hub is tasked with supporting the UK fluids community (see [NFFDy Hub Cfs](#), §3.1 'Support the UK Fluids Community'), and this would naturally be best done through UKFN.

The use of funds will be discussed with the NFFDy Hub EC, but it would be helpful to know if the UKFN EC had any suggestions to feed into the discussion on specific ways a small injection of funding could help. There is around £15K available at present. Note that £1-2K have already been earmarked recently to support a joint meeting of the 'Biologically active fluids' and 'Non-Newtonian fluid mechanics' SIGs in 2024, co-organised by three of the NFFDy fellows.

Would the EC suggest UKFN-related activities that could be considered for funding.

Item 11: UKFN 2.0

The UK Fluids Network will have existed in its current form for almost 10 years by the end of the NFFDy Hub grant (September 2016 to February 2026), and a refresh could therefore be beneficial.

One EPSRC-funded network that has been in existence for around the same length of time is the [EPSRC Robotics and Autonomous Systems \(UK-RAS\) Network](#), which is now on its third round of funding. MPJ has been in contact with several of the key personnel, and they suggested approaching EPSRC first to gauge their level of interest. A meeting subsequently took place with Andy Lawrence and Chloe Harman-Weaver (31/10/2023). Notes from both meetings are given in Annex B, along with possible next steps.

■ Would the EC discuss the points outlined in the Annex.

Annex A: New SIG application

1. **SIG title:** Uncertainty quantification and data analytics in fluid mechanics

2. Description of SIG

a. Subject and scope

Uncertainty quantification (UQ) is a multidisciplinary field of science that incorporates various mathematical, statistical, and computational techniques for the purpose of quantifying uncertainty in models, simulations and data, as well as, objectively using the uncertainties to drive algorithms.

This SIG aims to facilitate the adoption of UQ techniques for theoretical, numerical and experimental fluid mechanics problems. The following key aspects will be covered by this SIG:

1. Forward UQ: Addressing uncertainty propagation problems, reliability and risk assessment, error estimation, and sensitivity analysis (local, global, adjoint-based).
2. Inverse UQ: Dealing with problems such as model calibration, Bayesian and statistical inference, and information theory, where data is used to infer models, their parameters and uncertainties.
3. Optimization: Exploring computer and design of experiments, and Bayesian and robust optimization.
4. Modelling: Focusing on multilevel and multifidelity modelling, surrogate modelling based on regression, reduced-order models, and dimensionality reduction, which help reduce computational costs to construct accurate predictive models over the space of state variables and parameters.
5. Others: Covering topics such as data assimilation and remote sensing, verification and validation, and automated/in-situ data analysis workflows.

b. Objectives

The main purpose of this SIG is to bring together scientists who are actively developing and using relevant UQ and data analytic approaches in connection to fluid mechanics research. A goal is to facilitate transferring the knowledge from the UQ field to the fluid dynamics community within the UK. This will be followed through:

- * Workshops and training,
- * creation of networks for national and international collaborations,
- * effective development and use of UQ tools (methods and software) applicable to fluid mechanics,
- * collecting/producing online resources on UQ for fluids,
- * collaborations/event with other SIGs,
- * preparation of research proposals depending on funding opportunities.

3. Proposed members

- **Matthew Juniper**, Professor of Thermofluid Dynamics, University of Cambridge
Area of expertise: Flow Instability, Adjoint methods, Bayesian Inference, Bayesian Learning
- **Sylvain Laizet**, Professor in Computational Fluid Mechanics, Imperial College London
Area of expertise: High Performance Computing, Computational Fluid Dynamics, UQ, Active Control Turbulent Flows
- **Saleh Rezaeiravesh**, Lecturer in Engineering Simulation & Data Science, The University of Manchester
Area of expertise: UQ, data-driven methods, scale-resolving turbulence simulation, data and time series analyses, optimisation, Bayesian inference, software development.

4. Contact details

- **Leader:** Saleh Rezaeiravesh, saleh.rezaeiravesh@manchester.ac.uk, Department of Fluids and Environment, The University of Manchester
- **Co-leaders:** Matthew Juniper, mpj1001@cam.ac.uk, Department of Engineering, University of Cambridge; Sylvain Laizet, s.laizet@imperial.ac.uk, Department of Aeronautics, Imperial College London

Annex B: UKFN 2.0 – notes from meetings with UK-RAS and EPSRC, next steps

1. Discussions with Andy Weightman, Barry Lennox, and Rob Richardson about the [Robotics and Autonomous Systems \(RAS\) network](#), which is currently on its 3rd round of EPSRC funding.

Their process was as follows.

- Consult the RAS community. Is the network worth continuing? What could the network do next (not more of the same)?
- They considered different funding models but, like us, excluded the partner-funding model (e.g. ERCOFTAC).
- They spoke to EPSRC to say what they could do and what it could cost (£0.5M).
- EPSRC invited them to submit for another round of funding.
 - EPSRC were very keen on matched funding from institutions
 - EDIA (final A is 'accessibility') in the leadership team is important
- RAS made a briefing document to invite Expressions of Interest (a few 100 words) from the RAS community:
 - this is what we're planning to do
 - who wants to do it? why? what should we do? what are your ideas?
 - [we could run a zoom brokerage activity with EPSRC]

Then they opened a form on the website to invite Eols.

- RAS ran an internal EPSRC-style peer review selection process to choose the group who would submit the proposal.
- That group wrote the proposal, with an AB containing members of the previous EC.

2. Discussion with Andy Lawrence and Chloe Harman-Weaver (EPSRC)

We have the UKFN SIGs as a platform (two-thirds want to continue under their own steam). We have the NFFDy scheme (£3.5M) and the NFFDy Hub (£0.3M). What do we want to do with this platform?

Andy's questions/points:

- What step change would additional funding enable?
 - we need to take it in a different direction and create a new dynamic
 - could this become the proto-institute for the postulated National Fluids Institute?
- Do we want a Network+, with small amounts of money for scoping studies?
- Do we want research money for big challenges?
- Do we want another round of NFFDy's?
 - he doesn't rule this out, if we can make a case for it
 - the case would involve 'future leaders' and 'we cannot afford not to do this'
- Could we create the glue that holds the NWTF together?
- Are there hooks in the 'Our Fluid Nation' report that we could use?
- Can we involve MRC, NERC, STFC, as well as EPSRC?
- Can we involve some chief scientific advisers (CSAs)?

3. Possible next steps

- Create a briefing document about the Fluids CDTs, UKFN, 'Our Fluid Nation' report, the NFFDy scheme:
 - a summary of main aims of each, how much they are/were funded, what they achieved
 - a situation report, e.g. how newsletter works now, how CDT is funded
 - include that the question now is 'What do we do next?'
- Consult the UKFN community via an online survey (similar to that in November 2020): ask 'What do you think we can do next?'
- Run a Zoom discussion with interested UKFN members, esp. early/mid-career, attended by Andy and Chloe.
- Follow RAS procedure.