

## UK RESEARCH AND INNOVATION

### ENGINEERING AND PHYSICAL SCIENCES RESEARCH COUNCIL

#### NOTE OF THE 4<sup>th</sup> EPSRC SCIENCE ENGINEERING AND TECHNOLOGY BOARD (SETB) MEETING, HELD ON 10 SEPTEMBER 2020, HELD REMOTELY VIA ZOOM

- In attendance: Professor Charlotte Deane (EPSRC) (SETB Chair) (*from item 4*)  
Professor Cameron Alexander (University of Nottingham)  
Mr Jonathan Legh-Smith (BT)  
Professor Paul French (Imperial College London)  
Professor Dame Jane Jiang (University of Huddersfield)  
Dr Leigh Lapworth (Rolls-Royce)  
Professor Adrian Mulholland (University of Bristol)  
Professor Graham Niblo (University of Southampton)  
Professor Susan Rosser (University of Edinburgh)  
Professor m.c. schraefel (University of Southampton)  
Dr Mike Sutton (Lubrizol)  
Professor Phillip Taylor (University of Bristol)
- Apologies Professor Su Taylor (Queen's University Belfast)
- Council Members: Professor Nick Jennings (Imperial College London)  
Dr Joe de Sousa (Melhor Consulting)
- EPSRC Staff: Andrew Bourne (EPSRC Director, Partnerships)  
Jane Nicholson (EPSRC Director, Research Base)  
Kedar Pandya (EPSRC Director, Cross Council Programmes)  
Luke Davis (EPSRC Head of Programme, Big Ideas)  
John Hand (EPSRC Head of Programme, Physical Sciences) (*item 4*)
- Secretary: Sinead Balgobin (EPSRC, Senior Manager, Governance and Planning)

#### 1. Welcome and Formalities (SETB Chair)

- 1.1. Andrew Bourne (AB) welcomed everyone to the meeting and formally opened the meeting on behalf of the Chair, welcoming the new Head of Big Ideas, Luke Davis (LD). Apologies had been received from Professor Su Taylor.
- 1.2. The SETB agreed that the note of the May meeting was an accurate record of the meeting. It was noted that the discussion and action related to having a public webpage of submitted Big Ideas was incorporated into a wider action about communication which LD will be taking forward.

#### 2. Big Ideas – Update on previous Big Ideas (Luke Davis)

- 2.1. LD presented a dashboard of Big Ideas previously seen by the board and their current status, noting those which are running or have run workshops recently and will be providing updated submissions.
- 2.2. SETB noted that there are several Big Ideas which are being used to inform strategy and advised that it is important to communicate this follow through process. EPSRC should articulate what has followed on from Big Ideas which haven't been used for discrete funding

opportunities but have influenced the landscape in different ways (e.g. introducing an idea into strategic high level conversations – especially if ideas are ahead of their time).

- 2.3. SETB asked for more information about other UKRI council Big Ideas initiatives including submission rates and outcomes. LD agreed to discuss this with the other Big Ideas leads and explore how to share this information with the SETB.
- 2.4. SETB advised that EPSRC must think about how to champion, drive and incentivise submissions. Big Ideas should be about bringing people together, and there is more work to be done to get community buy-in to the initiative.

**ACTION: Luke Davis**

### 3. Big Ideas – Assessment of Updated Ideas

- 3.1. LD introduced this session by providing some context about the principles of the process to consider updated Big Ideas.
- 3.2. The SETB discussed four updated Big Ideas submissions, providing specific advice for each one, which will be taken forward by the Big Ideas team in conjunction with the submitters. The Big Ideas discussed along with the overall SETB recommendations are listed below:

| Title   | Submitter                                  | Recommendation  | Next steps  |
|---|--|---|---|
| Computer-Aided Whole-Cell Design  | Lucia Marucci (University of Bristol)      | SETB determined that the previous feedback had not been sufficiently addressed. As such, the Big Idea did not meet the requirements to be submitted into the Ideas Bank as currently written. SETB recommended the submission be revised a final time.  | Develop further; EPSRC-funded workshop not recommended  |
| Making Senses: Enabling sensors for the sustainable low-cost internet-of-things | Jeremy Baumberg (University of Cambridge)  | SETB determined that the previous feedback had not been sufficiently addressed. As such, the Big Idea did not meet the requirements to be submitted into the Ideas Bank as currently written. SETB recommended the submission be revised a final time.  | Develop further; EPSRC-funded workshop not recommended  |
| National Centre for Decarbonising Heating and Cooling (NCDHAC)                  | Sam Riches (Decarbonisation/ Energy Theme) | SETB recognised the importance of the area and the effort of the submitters to update the idea. However, the SETB advised that the Ideas Bank would not be the correct vehicle for this submission. The SETB advised instead that EPSRC should take forward work in this area to support the community and the research highlighted in the Big Idea submission. | To be taken forward as work within the Energy Portfolio |
| Transition to a Sustainable Zero Pollution Economy                              | Mary Ryan (Imperial College)               | SETB were satisfied that the previous feedback had been met and that the idea should be put into the EPSRC Ideas Bank. Any next steps should seek to involve social scientists and policy makers in a more integral way to ensure adoption of the outputs and outcomes of the Big Idea.   | Idea submitted into Ideas Bank                          |

**ACTION: Luke Davis**

## 4. Making the Most of Digital Opportunities for Chemistry Research

- 4.1. John Hand (JH) presented a paper on Digital Opportunities for Chemistry Research. This session was an opportunity to get SETB advice on what is currently a very complex space. The paper presented an overview of EPSRC's efforts in this space and the key aspects at play in the landscape. JH noted that EPSRC has not completed a detailed analysis of the landscape but anticipate that there is a lot of research in this space, but it may not be labelled as Digital Chemistry/Materials, and the area is not limited to new digital techniques, but also the advances in discovery research these new techniques enable. JH also noted several potential actions and activities being considered by EPSRC in this area, including working with business, landscape mapping, and funding to bring centres together.
- 4.2. SETB agreed that this is an important area and were very supportive of EPSRC's ambitions and activities. Key points raised by SETB included:
- This area has the potential to be transformative in many areas and aspects of society, as well as transforming the science itself. The UK needs to step into this opportunity if it wants to maintain its world leading position;
  - SETB advised that mapping of the landscape in this area is needed, along with potential networking activities. The board agreed that they would like to see much stronger interaction with industry to focus on some specific challenges where digital chemistry can make an impact and take the research opportunities and technologies/techniques to the next level;
  - Regarding the four areas identified in the paper, SETB advised that all are equally important, prioritising one or few will lead to bottlenecks;
  - SETB noted parallels with the Quantum Technologies and Synthetic Biology programmes and advised that EPSRC reflect on lessons learned from these activities. In Digital Chemistry, EPSRC must be proactive, making change happen and engaging with Innovate UK at appropriate times and point to pull through and realise the benefits of the area.
- 4.3. Charlotte Deane (CD) summarised the discussion in two main points:
- The headline is about transforming the discipline of chemistry, and the benefits that will arise from this transformation;
  - EPSRC should think about what has happened in other programmes like Quantum Technologies and Synthetic Biology, learning from these programmes.

**ACTION: John Hand**

## 5. Spending Review Update

- 5.1. Charlotte Deane (CD) gave an overview of the latest developments relating to the Spending Review. She explained that EPSRC is positioning itself within the UKRI bid, which is then positioned within the wider BEIS bid. It was noted that there may be an uplift to the science and innovation budget, but CD clarified that this wouldn't necessarily lead to a UKRI uplift but would also engage with other departments, and across the country. CD noted that there will be a government announcement about simplifying the funding process, which is an interesting challenge as it incorporates all of UKRI.
- 5.2. CD presented the most up to date version of EPSRC's priorities for the Spending Review which identify key areas for Engineering and Physical Sciences (EPS), and links to other councils and government departments. She also noted the cross-cutting priorities identified in the plan, which included Talent and Skills and Infrastructure.

- 5.3. SETB noted that talent and skills is especially important for new and emerging technology areas, as without skilled people we cannot take advantage of scientific advances in a meaningful way. It is important to recognise and support different career paths as well as nurturing rising stars throughout their careers in order to be internationally competitive, which will also involve influencing university culture. JN provided an update on changes to the EPSRC Fellowship Scheme, which from Autumn 2020 will consist of Open Fellowships and Post-Doctoral Fellowships. This is in order to provide Fellowship support across career stages, including mid-career which is often perceived as being excluded.
- 5.4. SETB asked how they can help with the development of Spending Review plans and if there was further narrative information to which SETB can provide input. AB has put together a narrative for EPSRC Council which can be shared with SETB. CD noted that EPSRC may reach out to members of SETB to support the development of Spending Review plans, and as such SETB members should expect to hear from EPSRC.

**ACTION: Andrew Bourne/Sinead Balgobin**

## 6. Big Ideas – Assessment of new Big Ideas

- 6.1. Luke Davis introduced this session by providing some context about the principles of the Big Ideas assessment process.
- 6.2. The SETB discussed five new Big Ideas submissions, providing specific advice for each one, which will be taken forward by the Big Ideas team in conjunction with the submitters. The Big Ideas discussed along with the overall SETB recommendations are listed below:

| Title  | Submitter                                   | Recommendation   | Next steps   |
|--|---|--|--|
| (R)Evolution: Engineering and Controlling Evolution  | Guy-Bart Stan (Imperial College)            | SETB would welcome the opportunity to review an updated submission given the importance of the area, the timeliness, and its potential to be transformative. The updated submission must better articulate how and why this work will be undertaken. There is a need for the idea to be broadened further. | Develop further; EPSRC-funded workshop not recommended   |
| Traffic management and control systems for connected and autonomous vehicles                   | Washington Yotto Ochieng (Imperial College) | SETB determined that this submission did not meet the requirements of a Big Idea.  | Submission progresses no further through Big Ideas   |
| Solving Societal Challenges with Dynamical Chemistry – DynamiChem                              | Andrew Orr-Ewing (University of Bristol)    | Given the importance of the area, the timeliness, and its potential to be transformative SETB would recommend the Big Idea be integrated into ongoing work on Digital Chemistry by the Physical Sciences theme at EPSRC.   | Develop further within the Digital Chemistry work being undertaken by Physical Sciences at EPSRC |
| Novel Materials for a Healthy Nation - Materials design to control microorganism contamination | Claire Spooner (Materials Theme)            | SETB would welcome the opportunity to review an updated submission given the importance of the area, the timeliness, and its potential to be transformative. However, before reviewing an updated Big Idea SETB would like a mapping exercise to take place and scope to be clarified first.               | Develop further; Workshop funding dependent on mapping exercise and clarification of scope       |

|   |                                  |  |  |
|---|----------------------------------|--|--|
| Metamaterials Revolution: Next generation control of energy and information | Claire Spooner (Materials Theme) | SETB would welcome the opportunity to review an updated submission if appropriate following further development. However, before reviewing an updated Big Idea SETB would like a mapping exercise to take place and scope to be clarified first. | Develop further; Workshop funding dependent on mapping exercise and clarification of scope |
|---|----------------------------------|--|--|

- 6.3. Susan Rosser offered to help with the development of *(R)Evolution: Engineering and Controlling Evolution*. Jang Jiang offered to help with the development of *Metamaterials Revolution: Next generation control of energy and information*.

**ACTION: Luke Davis**

## 7. AOB and Close

- 7.1. Reflecting on the discussions in the meeting, SETB noted that several themes were reoccurring, especially with respect to feedback on Big Ideas. SETB advised that EPSRC must consider how best to provide advice and guidance to the community to develop Big Ideas submissions without being too proscriptive at early stages.

**ACTION: Luke Davis**

- 7.2. SETB were asked to review the information provided in the additional paper SETB 09-20 – “Briefing Note on Institutes for SETB” and provide any comments or feedback ahead of the Institutes Evaluation meeting on the 25th November 2020.

**ACTION: SETB**

**The next meeting of the EPSRC Science, Engineering and Technology Board will be the Institutes Evaluation Meeting and will be held on the 25 November 2020, remotely via Zoom.**

### Summary of actions:

| Action | Description  | Owner                             |
|--------|--|-----------------------------------|
| 04-01  | Consider ways for EPSRC to improve communications around the benefits of being a submitter and existing Big Ideas; potentially learning lessons from other UKRI council initiatives                                    | Luke Davis                        |
| 04-02  | Communicate feedback to Big Ideas submitters and take forward any specific actions (e.g. workshops) ( <i>for items 3 and 6</i> )   | Luke Davis                        |
| 04-03  | Take forward the advice of the SETB on Digital Opportunities for Chemistry Research  | John Hand                         |
| 04-04  | Communicate SR narrative from Council to SETB  | Andrew Bourne/<br>Sinead Balgobin |
| 04-05  | Consider how best to provide advice and guidance to the community to develop Big Ideas submissions   | Luke Davis                        |
| 04-06  | Review the information provided in the additional paper SETB 09-20 – “Briefing Note on Institutes for SETB” and provide any comments or feedback ahead of the Institutes Evaluation meeting on the 25th November 2020. | SETB                              |