



**Synthetic Biology Leadership Council
Meeting 10, 2015 Open Meeting
Thursday 16th July 2015**

**Royal Academy of Engineering,
Prince Philip House, 3 Carlton House Terrace, London, SW1Y 5DG**

Attendees:

Prof Lionel Clarke	Co-Chair, SBLC
Prof Janet Bainbridge	UKTI
Martin Cannell	Defra
Dr Amanda Collis	RCUK
Sue Dunkerton	Knowledge Transfer Network
Mike Edbury	Government Office for Science
Tim Higginson	Department for Business, Innovation & Skills
Dr Chris Jones	Innovate UK
Alastair Kent	Genetic Alliance UK
Prof Richard Kitney	Imperial College London
Jacquelyne Poon	Department for Business, Innovation & Skills
Prof Dale Sanders	John Innes Centre
Prof Joyce Tait	Innogen Institute, University of Edinburgh
Dr Amy Tayler	Synthetic Biology Special Interest Group, Knowledge Transfer Network

Apologies:

George Freeman	Department for Business, Innovation & Skills and Department of Health, Co-Chair, SBLC
Shamimara Ahmed	Department for Business, Innovation & Skills
Sarah Cundy	Defra
Prof Tim Dafforn	Department for Business, Innovation & Skills and University of Birmingham
Dr Tim Fell	BioIndustry Association and Synthace
Dr David Tew	GSK

Administrative Support:

Jean Aligorgi	KTN
Dr Tristan Eagling	KTN

Registered observers:

Steve Bates Bio	BioIndustry Association
Simon Bayly	Invest in Oxfordshire
Elizabeth Bohn	Royal Society
Linda Brooks	Thermofisher
Alex Broomsgrave	EPSRC
James Brown	Alcmene
Steve Chambers	SynbiCITE
John Collins	SynbiCITE
Ffion Davies	Alcmene
Frank Fourniol	Royal Society
Sam Gallagher	University of Oxford
Richard Hammond	Cambridge Consultants
Roland Jackson	Sciencewise
Iain McWilliam	Arrayjet Ltd
Claire Marris	King's College London
ColetteMatthewman	John Innes Centre
Robert Meckin	University of Sheffield
Julian Melchiorri	Arborea Ltd
Kedar Pandya	EPSRC
Michael Paton	Health & Safety Executive
Vitor Pinheiro	University College London
Michael Roberts	Synpromics
Michael Rothwell	Tecan UK
Andy Scott	Cook it
Ricarda Steinbrecher	EcoNexus
Sagar A Sumaria	So Ethical Media
Mimi Tanimoto	UK Plant Science Federation
Alasdair Taylor	Royal Society
Joanna Vlahopoulou	Procellia Ltd
Tom Wilding-Steele	BBSRC
Tuck Seng Wong	University of Sheffield
Xian Zhang	Lucideon
Alexey Zharov	Trade Delegation of Russia in the UK

1 Welcome & Introduction

Prof Lionel Clarke formally welcomed everyone to the meeting, explaining that the SBLC is committed to three meetings per annum, one of which is open. The planned format for the meeting included a one-hour boardroom style session to cover internal council business, after which Lionel would introduce current progress with the refresh of the UK synthetic biology roadmap. Various SBLC members would then describe the different sections of the new strategy. Over lunch, the registered attendees could indicate their interest in discussion the different sections in breakout groups, along with any other topics for discussion.

The SBLC members introduced themselves. Lionel noted the apologies as above.

2 SBLC Internal Business

The actions arising from the last ordinary meeting (SBLC8, 18th March 2015) are available in Annex 1. Actions 8-3, 8-4, 8-5, 8-8, 8-10 and 8-12 were noted as done or on going with no further comment. Actions 8-7 and 8-13 were deferred to the next ordinary meeting.

Action 8-1: Prof Richard Kitney to initiate the involvement of industry (through the SBLC), Keltie and the Innogen Institute in the development of the EZ-MTA.

Prof Richard Kitney noted this as on going, and explained that SynbiCITE (i) has pulled together a group meeting regarding advice on intellectual property (IP), (ii) has met with Chris Jones, (iii) has raised this with the SBLC Science & Technology Sub-Group, and (iv) will meet with those developing EZ-MTA.

Action 8-2: SynBio SIG to provide guidelines on use of the UK synthetic biology branding.

This was noted as on going and guidelines will be uploaded to the website to coincide with the refresh of the synthetic biology roadmap.

Action 8-6: Dr Amy Tayler to circulate the upcoming SBLC meeting dates: on 2nd July an extraordinary closed meeting of the SBLC to focus on the roadmap refresh; on 16th July an open meeting; on 22nd October a closed SBLC meeting.

Done, noting the subsequent inclusion of an additional half-day meeting on Tuesday 1st September 2015.

Action 8-9: SBLC membership and proposed register of members' interests to be added to the meeting agenda for 2nd July 2015.

Lionel explained that the membership of the SBLC would be reviewed as the synthetic biology roadmap is refreshed.

Action 8-11: Alastair Kent or Joyce Tait to raise synthetic biology applications in medicinal products and the associated regulation at a subsequent SBLC meeting.

Prof Joyce Tait explained that she is running a workshop with a group of regulators in London, during which the regulation of synthetic biology applications in medicinal products will be discussed.

Action 8-14: Prof Lionel Clarke to consider how cyber-security might be included in the roadmap refresh

Lionel explained that this is being considered as the synthetic biology roadmap is refreshed.

Action 8-15: Dr Amanda Collis to connect Vincent Martin (Concordia University) to the German contacts developing a proposal to follow ERASynBio.

Dr Amanda Collis explained that the funders of ERASynBio hope to form a self-sustaining group that can bridge the gap until a new, related ERANet is funded. The group has connected with the appropriate parties in Canada.

The Minutes of the previous meeting were agreed, and will be uploaded to the website shortly.

Action 10-1: SBLC secretariat to upload the agreed minutes from SBLC 8 to the SBLC website.

Joyce gave an update on the recent meeting of the SBLC Governance Sub-Group (GSG). Claire Hamilton and Sarah Cundy from Defra joined the SBLC GSG to give an update on negotiations regarding the Convention on Biological Diversity (CBD). An online discussion forum regarding the CBD, in which several members of the SBLC GSG have participated, has now closed. Alastair Kent, who leads a patient group, provided an update on concerns regarding awareness and delivery of synthetic biology for medical applications. Joyce explained that there is a need for the SBLC to lead a well-informed parliamentary debate, and as such a workshop will shortly be held with the appropriate regulators. The GSG would like to see the KTN run a workshop with researchers, clinicians and regulators. Julian Hitchcock has participated in European discussions to develop a definition for synthetic biology.

Action 10-2: Prof Joyce Tait and Dr Amy Tayler to explore the possibility of the KTN running a workshop regarding medical applications of synthetic biology with researchers, clinicians and regulators.

The SBLC agreed the minutes of the recent SBLC GSG meeting.

Action 10-3: SBLC secretariat to upload the agreed minutes from the recent SBLC GSG meeting to the SBLC website.

Lionel invited any other internal business from the SBLC members. Dr Amy Tayler explained that there is the possibility of hosting a synthetic biology meeting in the margins of European Forum for Industrial Biotechnology 2016, which will take place in Glasgow in October 2016.

3 Introduction

Lionel thanked the participants for joining the SBLC meeting, noting that this is an important part of the process to refresh the synthetic biology roadmap.

Lionel provided some background, explaining that a roadmap working group (many members of which are here today) was convened by David Willetts MP in late 2011, and which published the roadmap in July 2012. UK Government went on to identify

the '8 great technologies', of which synthetic biology was one. Three years on, we must review and update the roadmap.

The UK has a strong legacy in biosciences and associated technologies, including many important developments and discoveries, such as the discovery of the double helical structure of DNA by Crick and Watson in 1953, DNA fingerprinting, and the human genome project.

Deciding whether synthetic biology is new or not is confusing. The fundamental biological aspects of modifying genes and understanding the impact of DNA on organisms goes back to early 1970s, and we are building on a legacy of bioscience and regulatory frameworks. As Sidney Brenner mentioned on the 60th anniversary of Crick and Watson's paper on the structure of DNA, since the beginning of this century there has been a paradigm shift not in our understanding of the role of DNA, but around DNA as a physical embodiment of information. We now have the computer capability to handle the complex and massive data held in DNA. To handle such complexity, it important to think in engineering terms using standards and modularity.

The synthetic biology roadmap outlined a vision for a UK synthetic biology sector that should be: economically vibrant, diverse and sustainable; cutting edge; and of clear public benefit. Synthetic biology should not be developed and implemented purely because it is interesting, but because it gives us the tools and technologies to help address grand challenges responsibly. Since 2012, the five overarching recommendations in the roadmap have been supported and implemented and are ongoing. These include: investment in underpinning research; building a skilled and well-energised community; investing to accelerate technology responsibly to market (noting that responsible research and innovation is particularly powerful in the UK approach, being part of the culture and value system of the way we operate); assuming an international role; and establishing a leadership council.

The SBLC itself is a small independent group supported by Government and driven by industry, researchers, Government, knowledge transfer organisations, funding agencies and civil society. The main stakeholder groups represented include large industry, SMEs, SynbiCITE, the Synthetic Biology Research Centres (SBRCs), the Department for Business, Innovation & Skills, UKTI, regulators, the Knowledge Transfer Network, Innovate UK, Research Councils, and NGOs, plus ad hoc experts (such as the British Standards Institution) as and when required. This group small and agile, and the members each represent and consult the wider community. UK synthetic biology and the SBLC receive broad support (both institutional and structural) across the Research Councils, learned societies, and through Government departments (through both direct and indirect interactions with us).

The UK approach has been recognised internationally, and others have sought to meet with us, learn from us and partner with us. We must continue to set a good example.

Three years on from the publication of the roadmap, it is timely to ask what we have learned, to determine whether we are still on the right track, and to consider whether we are moving too fast or not fast enough. We must identify the next challenges in supporting and developing this field in the UK. We've set ourselves a challenging process, which has already involved scouting workshops and a main workshop on 16th June 2015. Lionel explained that today the SBLC members will first present the main themes that have emerged through the refresh process thus far, before a series of breakout sessions are held after lunch. The facilitators and note takers will agree the key messages and feed them back to the SBLC for consideration during the refresh of the synthetic biology roadmap.

4 Roadmap refresh: introductions to each theme

Introduction (Lionel Clarke)

Lionel gave an introduction explaining that synthetic biology is a technology with huge potential and which is changing rapidly. Lionel referenced the 'Carlson Curve', which shows the relative increase in speed and reduction in cost of DNA sequencing, and which is now mirrored in the speeds and costs of DNA synthesis and analysis. The rapid growth of the human population in a resource-constrained world leaves us with considerable global challenges. Synthetic biology won't solve the world's problems, but it does have the potential to deliver some valuable and unique tools and techniques, and we need to identify the niches in which synthetic biology can deliver the greatest benefits.

The workshop on 16th June 2015 explored five main themes: research challenges; barriers and opportunities; training; scale-up & manufacturing; and regulations & governance. A pre-meeting survey revealed the following points are important to the community:

- **Underpinning technologies** that span foundational platforms, which in turn lead to better understanding of more complex systems and newly characterised hosts and chassis.
- **Mechanisms and routes to industry**, including standards and metrology, design tools, scale-up and scale-out, and industry pull.
- Continuing to engage and build the **community**, cutting across institutional boundaries (including Government, Universities etc).
- **Operating values**, including RRI, risk assessment, embedding social benefits in our thinking, continuing to understand consumers, and public understanding.
- **Skills**, not just interdisciplinary skills, but bringing engineering and biology together earlier.
- **Applications**, prioritising efforts in different areas including both quick wins and aspirations for the future.

Lionel explained that a synthetic biology doesn't sit alone, but that it is part of the broader bioeconomy. In a simplistic way, synthetic biology is the innovation in tools and techniques that can be translated to deliver benefits. If we think about design, we can translate these tools into manufacturing capability. Synthetic biology isn't on

a single trajectory, but rather it can impact on many different applications areas, each with their own supply chains, manufacturing needs and regulatory frameworks. If we are to generate and retain value in the UK, we must link this all together with a full and coherent approach.

Lionel invited questions from the floor.

James Brown, Alcmene: When we go to the Bay Area, we see tens to hundreds of companies. Why do you think more people haven't started a company in the UK?

Lionel suggested that the Bay Area is building on a legacy of many years of developing technologies, which has developed a culture and an ecosystem with a critical mass. The UK doesn't yet have such a legacy, and it is difficult to start from scratch. However, the focus of the new plan is to get to that point, with an environment in which new businesses can thrive, and one of the breakout sessions this afternoon will explore this further.

Stan Thiophilou, BlueBio: I'm setting up a new business, and it's really hard to acquire the necessary lab space at low cost.

John Collins (SynbiCITE) explained that the Innovation and Knowledge Centre has been set up to help meet this need.

Grand challenges (Richard Kitney)

Richard explained that he is coordinating the SBLC members considering grand challenges and opportunities for synthetic biology. As synthetic chemistry enabled an oil-based economy, synthetic biology will enable a bio-based economy. The synthetic biology roadmap took a broad view, identifying food, water and energy as areas in which synthetic biology could contribute. However, we can now achieve more granularity.

In 2012, the World Economic Forum rated synthetic biology and metabolic engineering as second amongst emerging technologies. As DNA sequencing becomes faster and cheaper, DNA synthesis also becomes more affordable and accurate. Internationally, synthetic biology is recognised as an engineering approach. Engineering biology by design provides us with platform technologies that can be translated in different areas (such as health, crops & soil, and bio-remediation).

Platform technology: We have made significant progress, but there is still a lot to do, including metrology, standards, modeling, (such as making CAD tools more predictable), and automation (which will provide us with additional reliability and remove human error from routine tasks).

Applications: Examples include: using waste as a feedstock; replacing oil-based feedstocks; creating light, strong, and smart materials; healthcare applications (diagnostics, theranostics, vaccines, biosensors); processes, agri-science (such as environmentally-friendly pesticides).

No questions came from the floor.

Translation, commercialisation and scale-up (Chris Jones)

Chris explained that we want to see a flourishing and sustainable bioeconomy for synthetic biology in the UK. International markets need internationally competitive companies, and we must consider the following questions:

- In what areas are we internationally competitive?
- Where can our academic excellence add most value?
- Where should we focus?
- Is synthetic biology a creative tool or a productivity tool?
- Can we create a bio-industry manufacturing base?
- If so, should it be concentrated or dispersed?
- Are data capture and digital capture the keys to value capture?
- Is synthetic biology a know-how rather than an IP-led discipline?
- Can synthetic biology extend the life of a company, such as through know-how?

At the workshop on 16th June 2015, Chris explored a wide range of potential applications, including some quick-wins in biologics, agri-tech and IB, as well as some more aspirational applications in lightweight batteries. However, the group concluded that we must make use of the investments we have made thus far. To facilitate this, we need:

- Longer-term horizons for support, not just from the public purse (such as a Catalyst fund) but from private sector capital, too.
- Automation and robotics.
- More lab and development space, and the ability to match the availability of these spaces with where they are most needed.
- Capital infrastructure, and the ability for people to use it.
- Market insight and awareness to be linked to the technical capabilities.
- To reconsider the equity structure of university spinouts, potentially through a UK technology transfer office for synthetic biology.
- Support to connect experienced entrepreneurs with the emerging technologies.
- Larger initial investments in start-ups.
- Support for delivering the right skills into industry (such as through a dedicated KTP programmed).
- Scale-up facilities (although we have already invested heavily).

No questions came from the floor.

Regulation & Governance (Joyce Tait)

Joyce described the context in which science and technology must operate: an innovation ecosystem comprising policy, regulation and the stakeholder environment. The terms of reference for the SBLC GSG include how to manage interactions to represent as many parts of the ecosystem as possible. The workshop on 16th June 2015 identified the following points:

- Lots of comments on **definition** of synthetic biology: sometimes it is useful, but the more you focus on the definition, the more you will exclude, and the definition could

be inhibitory for some companies. We should keep as many options open as possible so future ideas don't get ruled out, or ruled in.

- **Regulatory system:** regulations aren't just about stopping dangerous products getting to market. Regulations should also support innovation in companies of all sizes, from big multi-nationals to small companies with truly disruptive ideas. Regulatory systems should be constructive to support innovation that meets a public need. For example, a fast track for certain kinds of drugs that meet the needs of orphan drug applications. It needn't lead to more innovations and products with societal disadvantages.

- **RRI:** Everyone agrees we need it. Joyce noted that most academic work on responsibility has focused on research, not innovation. We need to have more serious consideration of innovation, and how companies (both small and large) can be encouraged to be responsible without it being a burden. Responsibility doesn't just fall to scientists and innovators, but to regulators too (responsible regulation), and to all participants in stakeholder engagement. We must manage a discussion with a broad range of stakeholders with a variety of views without prioritising any one voice above the others.

Joyce described the idea of a 'synthetic biology landing and launching pad' for issues on governance, regulation and stakeholder engagement regarding synthetic biology. The aim to develop the best societal benefit is relevant both nationally and internationally.

No questions came from the floor.

Skills and Training (Amanda Collis)

Amanda explained that the 'skills and training' part of the roadmap refresh is coordinated by Prof Tim Dafforn, who is unfortunately unable to attend today.

Amanda acknowledged that synthetic biology skills and training have always been broader than purely scientific. Amanda described the already rich tapestry of different types of skills and training activities, such as undergraduate modules, iGEM, synthetic biology Masters by Research (MRes) courses, DTCs, LEAP fellows, and Lean Launchpad.

The workshop on 16th June 2015 considered the characteristics and qualities of the ideal synthetic biologist:

- **Business minded with entrepreneurial skills**, supported by schemes such as iGEM, LEAP fellowships, Lean Launchpad, CPD, skills schools, industrial science and management training.
- **Science skilled**, ensuring continuation of appropriate multi-disciplinary training mechanisms such as CDTs, SBRCs, and the IKC, and building on existing strengths with a synthetic biology teaching framework, which could later lead accreditation.

Questions were invited from the floor.

Roland Jackson, Science wise: There is a need to join up the presentations from Joyce (regulation & governance) and Amanda (skills & training).

Amanda agreed, noting that RRI has started to form part of the agenda through the networks and the SBRCs. Joyce added that synthetic biology teams need leaders with a broad overview and the ability to tap into the expertise of the specialists. However, it is also important not to partition people too early in the education system.

Another attendee (unknown) also commented that the discipline of synthetic biology is almost always conducted by a team rather than by an individual. However, the participants need to be able to speak different languages and to have the ability to think across all these problems.

Claire Marris, King's College London: What do you mean by agnostic disciplines?

Amanda described it as multi-disciplinary training that works towards meeting grand challenges.

Claire Marris: How would be embed RRI in skills training? Is it embedded in Lean Launchpad?

This was noted for consideration in the afternoon breakout session.

James Brown, Alcmene: Can you teach entrepreneurship?

Steve Chambers from SynbiCITE noted that Lean Launchpad tries to do just that.

James Brown, Alcmene: Should maths be a pre-requisite for biology?

Amanda noted that it is widely recognised that there is a need for more mathematical, more quantitative training for biologists. The funders have made a number of interventions, but it continues to be an issue and we need to support more maths training in the biosciences.

Community (Amy Tayler)

Amy described the composition and activities of the SBLC and the SynBio SIG, and the links made with other actors in the bioeconomy (including the Ari-Tech and Industrial Biotechnology leadership bodies). The SBLC has participated in a wide range of consultations and discussions related to regulation, public engagement, standards, IP, strategy and policy. The SynBio SIG, which has a growing membership of more than 1,000, provides support to the SBLC and facilitates community engagement. Highlights include connecting the research base and industry, and organising community-wide events to support initiatives and funding opportunities. Moving forward, the SynBio SIG needs to; expand community to market applications and cross-disciplinary connections; support the SBRCs and IKC with business connections and translation; make public resources more visible and accessible (simplification); where sensible, connect with the IB community and the wider bioeconomy; and engage the investor community (UK and overseas).

No questions came from the floor.

5 Lunch

Over lunch, attendees indicated which of the breakout groups they would like to join in the afternoon session, and were free to suggest additional topics for discussion.

6 Breakout discussion groups

The votes were cast as follows:

- Grand Challenges (Richard Kitney) 4
- Commercialisation and translation (Chris Jones) 12
- Governance & regulation (Joyce Tait) 6
- Skills & training (Amanda Collis) 8
- Community (Amy Tayler) 2

One additional topic was suggested: product security, and how it might impact on business models. It was suggested that synthetic biology products (based on DNA) could be easily stolen, and that it is difficult to protect your product from fraud. Another attendee explained that companies are exploring DNA encryption as a means of product security.

7 Feedback on breakout groups

Grand challenges (Richard Kitney)

The breakout group considered three fundamental challenges to which synthetic biology and systematic design could yield multiple solutions:

- **Water** - the importance of getting clean water locally (e.g.: arsenic detector, but what therapy do you then use).
- **Food** - alternative strategies like drought resistant plants, animal vaccines, diagnostics, animal welfare, environmentally friendly short-acting pesticides, making omega 3 in plants.
- **Energy** - modifying metabolic pathways (such as for more efficient sugarcane), bio-batteries, photosynthesis (artificial leaf project), might deep sea algae have properties we can use, using waste as a feedstock for energy.

Translation & Commercialisation (Chris Jones)

The discussion focused on three main challenge areas:

- **Translation from academia to business:** research could be more applied, and wider skill sets are needed (in entrepreneurship, product development, and project management) to move from technology-led to design-led implementation.
- **Industry to industry pull:** connections must be made between those with the right market insight and the technology providers. The Catalyst funding model has worked well, and could be applied specifically to synthetic biology.
- **More capital** - Inward investment, accelerators, support, equipment and access to finance.

Regulation and Governance (Joyce Tait)

The breakout group considered the need for better public and stakeholder engagement about innovation processes (rather than research). This brings several important challenges, including the need to:

- Frame synthetic biology more broadly, so positive and neutral frames take precedent before negative ones. The discussion could be shaped around a broader range of applications, including but not limited to the bioeconomy, rather than the technology itself.
- Reach stakeholders that don't know they need to be involved. The breakout group discussed whether a roadshow could increase the number of groups that are engaged, noting the importance of capturing feedback at the same time, either in real time or online afterwards.
- Increase representation, although the group noted that it is impossible for all stakeholders represented on the SBLC. However, the SBLC should think constructively about whom else could join to give sufficient representation.

Skills and training (Amanda Collis)

The breakout groups focused on a few points relating to multidisciplinary and the need to build on strengths and entrepreneurial skills:

- Synthetic biology is a team science, and styles of leadership are important.
- RRI needs greater recognition in undergraduate teaching and above, and both ethics and philosophy of science should be incorporated into training.
- There are gaps in systems understanding, network thinking (such as gene regulation and how involved and multi-layered it is), and quantitative thinking (maths).
- The SBLC has power as a convener, and it could reach out to the Department of Education around skills training at an earlier stage in schools.
- An open-access knowledge repository for synthetic biology.
- The importance of business skills, not just research skills and entrepreneurship.

Community session (Amy Tayler)

Amy explained that the community breakout group touched on all the other topics that were being discussed. From the KTN perspective, we've made start in building a community with the willing, but now we need to engage the less usual suspects. To do this, we must focus on communication to overcome language barriers. The group considered the definition of synthetic biology to be less important than it once was. Amy summarised the discussion around three main points:

- **Regulators need to be involved in community activities.** Regulations are important at the community level, and it should be incorporated into training. The ability to liaise with regulators (including Defra and HSE) is really important, and regulators must be part of any convened groups.
- **Breadth vs. depth.** The group considered whether a single person can be a synthetic biologist, or whether it requires a team of different specialists from different disciplines, in which case the leader must have that appreciation of the different disciplines and be able to overcome the language barrier, but they should be able to tap into the expertise of the specialists in their team.

- **Moving from competition to collaboration:** Recent investments have been awarded through competitive processes, in which independent applicants had to demonstrate why they were the best. Now that they are funded, we need to move away from competition and towards collaboration with an appreciation of other worldviews. Joint activity should be incentivised, such as by delivering training (not just to PhDs but also PDRAs and PIs), sandpits, and the funding of cross-institutional projects focused on grand challenges. The relevant parties should explore whether training in different modules in different disciplines in different institutions could gain a synthetic biology accreditation.

9 Summary and next steps

Unfortunately, at very short notice George Freeman MP was unable to attend the meeting and sent his sincere apologies. Tim Higginson stated that this open meeting had been really helpful and provided assurance that the Minister would be briefed on developments.

10 Summary of actions and final remarks

Since there was no longer any need to provide a further summary, Lionel assured the attendees that the SBLC remains open to ideas regarding the refresh of the synthetic biology roadmap, and that any further ideas should be channeled through the SynBio SIG. Lionel explained that the material discussed today will be written up by the facilitators and note takers and fed back to the SBLC shortly. Sue added that synthetic biology has roles to play in other activities, such as the new medicines initiative, and that such opportunities will be part of the future strategy.

11 Close

Lionel thanked the attendees for their participation, and hoped that they had found it a valuable opportunity to see how the SBLC operates and to engage with the refresh of the synthetic biology roadmap, before he drew the meeting to a close.

Summary of actions arising from SBLC8

Action 8-1: Prof Richard Kitney to initiate the involvement of industry (through the SBLC), Keltie and the Innogen Institute in the development of the EZ-MTA.

Action 8-2: SynBio SIG to provide guidelines on use of the UK synthetic biology branding.

Action 8-3: All requests for SBLC responses to be sent to (i) SBLC secretariat, (ii) Prof Lionel Clarke and (iii) Prof Joyce Tait.

Action 8-4: SynBio SIG to launch an online calendar of events and activities, and to encourage community members to suggest items to be entered.

Action 8-5: Innovate UK, SynbiCITE and the SynBio SIG to meet quarterly to share industry contacts.

Action 8-6: Dr Amy Tayler to circulate the upcoming SBLC meeting dates: on 2nd July an extraordinary closed meeting of the SBLC to focus on the roadmap refresh; on 16th July an open meeting; on 22nd October a closed SBLC meeting.

Action 8-7: Dr Chris Jones to provide a paper and update on completed Innovate UK synthetic biology projects at a future meeting of the SBLC.

Action 8-8: Dr Amy Tayler to publish the agreed minutes of SBLC7 on the SBLC website.

Action 8-9: SBLC membership and proposed register of members' interests to be added to the meeting agenda for 2nd July 2015.

Action 8-10: SBLC members to consider registering for the online portal and/or membership/observation of the AHTEG.

Action 8-11: Alastair Kent or Joyce Tait to raise synthetic biology applications in medicinal products and the associated regulation at a subsequent SBLC meeting.

Action 8-12: Prof Richard Kitney to raise cyber security with the SBRCs through the science and technology sub-group.

Action 8-13: Tim Fell to raise cyber security with the BIA synthetic biology advisory council.

Action 8-14: Prof Lionel Clarke to consider how cyber-security might be included in the roadmap refresh

Action 8-15: Dr Amanda Collis to connect Vincent Martin (Concordia University) to the German contacts developing a proposal to follow ERASynBio.