ITI Life Sciences

Call for Expressions of Interest

Gene & Genome Synthesis and Assembly

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Call Summary

ITI Life Sciences, a division of ITI Scotland Ltd., focuses on driving innovation in the Life Sciences sector, through successful and creative commitment of £150 million.

ITI's aim is to create new commercialisable technologies and stimulate business growth in Scotland. We identify future global market opportunities and create commercially driven research programmes to address future industry needs. To date, we have committed over £50 million in 5 research programmes in the fields of stem cell technologies, text mining, transgenic screening and safety models, cardiac biomarkers and lifetime fluorescence assays. Most recently ITI has instigated a drug discovery programme focused on Ubiquitin Signalling. Importantly, value release for ITI is achieved through the commercial exploitation of foreground Intellectual Assets (IA), generated through the research programmes, either by existing or new companies. Therefore, any ITI funded research programme must have the potential to generate valuable foreground IA.

This Call for Expressions of Interest is the product of an extensive analysis focused on trends in Synthetic Biology which identified key enabling technologies necessary for this field to reach a critical mass (a detailed market fore-sighting report based on our proven analysis methodology is available to our members). As a result of this in-depth analysis, ITI Life Sciences is keen to identify commercially viable R&D opportunities to form the basis of a research programme related to Gene & Genome Synthesis and Assembly. The goal of this programme is to develop innovative tools, strategies and methods that enable Gene & Genome Synthesis and Assembly. As a general guide for this type of opportunity, ITI Life Sciences usually commissions programmes in the range of £2-5 million ($4-10 million) with an average lifetime of two to three years. We are also keen to discuss follow-on funding and identify commercial partners to drive the anticipated programme outputs to market.

Why respond to this call for expressions of interest from ITI Life Sciences?

ITI provides more than just finance. We have a proven track-record of working with entrepreneurial companies and academic groups to create real innovation with a commercial focus by crafting exciting collaborative programmes. ITI Life Sciences will:

- Cover the full costs of delivering our programme
- Appoint experienced programme managers to coordinate delivery of programme goals
- Undertake real time commercial and competitive landscape analysis as the programme progresses
- Provide access to outstanding expertise and global networks

Responses are invited from companies, agencies, institutes, consortia, academia and individuals.

Call responses should be emailed to SYB@itilifesciences.com no later than May 5, 2008.

Rationale for Funding a Gene & Genome Synthesis and Assembly R&D Programme

Synthetic biology has a wide range of potential applications

Our in-depth technology and market analysis has shown that synthetic biology has potential applications spanning at least four major industries:

- chemicals (bioplastics, biocatalysis…),
- pharmaceuticals (production of biologics, drug target development…),
- energy (biofuel production, biomass conversion…),
- biotechnology (biosensors, tissue engineering…).

Some potential applications (such as biofuels and drug target development) impact markets of considerable size.

Key enabling technologies will be essential for potential applications to become active research areas

For synthetic biology to reach a critical mass, key enabling technologies are needed. Our analysis has shown that development of the following technologies would open the gates for active research in many synthetic biology applications: chassis organisms (well characterised organisms that can be used for numerous design projects), well characterised molecular components, regulatory circuits, informatics and design concepts, and Gene & Genome Synthesis and Assembly. Improvements in the later area seem to be the most accessible at present while having a strong impact on the field.

Progress is needed in Gene & Genome Synthesis and Assembly technologies

Gene & Genome Synthesis and Assembly are still too onerous, time consuming, labour intensive and error prone. For these reasons, access to this technology is limited for many researchers.

There are opportunities to improve technology at both the oligonucleotide synthesis and assembly stages of the gene & genome construction process. Radically novel approaches may also significantly impact the Gene & Genome Synthesis and Assembly field.

We believe that an ITI programme can make an impact

ITI has the capability and experience to bring research providers from various disciplines and help them work together towards achieving a common goal. ITI has a proven track record of creating convergence between leading technologies in different fields to achieve innovation and of delivering them to the market through commercial partners.

Where We See The Opportunities

The goal of this programme is to develop innovative tools, strategies and methods that enable Gene & Genome Synthesis and Assembly.

ITI seeks innovative approaches that will impact the synthetic biology and genome research fields by making gene & genome scale synthesis readily available to a broad researcher base. To reach this goal, proposed innovations should afford simplification and integration, short turnover time, high accuracy and cost reduction compared to current methodologies.

ITI wishes to discuss innovative responses that seek to achieve this goal by addressing SOME OR ALL of the key activities relating to Gene & Genome Synthesis and Assembly. ITI is also interested in the use of enabling technologies arising from other fields such as microfluidics.

The following are examples of possible innovative approaches to the Gene & Genome Synthesis and Assembly process.

These examples DO NOT INTEND TO BE LIMITING and we welcome proposals which demonstrate thinking outside of these approaches.

Development of innovative computational tools or methods to optimise genome construction at various stages (oligonucleotide synthesis, assembly…)

Development of innovative tools or methods to parallelise oligonucleotide synthesis, and reduce synthesis scale and reagent consumption. Such tools include, but are not limited to, synthesis on arrays or synthesis using microfluidic devices.

Development of innovative tools or methods to purify large numbers of neo-synthesised oligonucleotides in a highly parallel way.

Development of innovative reaction and sample handling methodologies that may include microfluidic devices to facilitate and automate oligonucleotide assembly into genes and genomes. These tools need to reduce sample handling, labour required, time and process cost.

Development of innovative tools and methods to detect and reduce errors in the Gene & Genome Synthesis and Assembly process.

Responses that address a specific key activity should provide information explaining how the activity can be integrated with downstream and upstream steps in the Gene & Genome Synthesis and Assembly process.

How to Respond

To guide and standardise responses, a response template is provided at www.itilifesciences.co.uk/SYB. Within the template there are two main sections:

Section A
An outline of the proposal should be provided utilising no more than 1500 words

Section B
Supporting information based on our Evaluation Criteria, outlined on the following page, must be completed where possible. This is to ensure that we can best assess the relative strengths and weaknesses of submissions.

We are not seeking comprehensive proposals fully detailing projects but rather overviews of proposed approaches (all answer boxes in the Response Template Form do not necessarily need to be filled out). Also, work packages and costings information should not be part of this proposal overview. We will develop them with our prospective partners at a later stage.

Call responses should be emailed to SYB@itilifesciences.com NO LATER than May 5, 2008.

Responders may be invited to discuss or provide further clarification on their submission in person or via teleconference.

ITI reserves the right to explore other opportunities within the synthetic biology field that may arise as a result of activities that are distinct from this particular Call for Expressions of Interest.

Please direct all questions regarding this call to nicolas.peyret@itilifesciences.com

Evaluation Criteria

The responses to this Call for Expressions of Interest will be reviewed against the criteria outlined below by an internal panel from ITI Life Sciences.

Innovation: Does the programme employ novel concepts, approaches or methods relevant to the Call For Expressions of Interest? Are the aims original and innovative? Does the programme challenge existing paradigms or develop new methodologies and technologies with a clear application?

Impact potential: Does this idea address an important challenge? If the technology or product concept is successfully developed what impact will it have on the market place and what is the potential for onward development?

Potential for foreground IA generation: The ITI operating model relies on the generation of foreground IA and we require evidence demonstrating how this will be achieved. Will the proposed work generate valuable and robust intellectual assets? What is the status of the background IA landscape? Is there freedom to operate?

Experience and environment: Does the idea take advantage of unique features of the environment or employ useful collaborative (academic or commercial) arrangements? Do the responders and any collaborators have a track record of successful delivery within this area? Does the environment in which the work will be done contribute to the probability of success? Is there evidence of institutional support?

Approach: Does the response outline a strategy for tackling the R&D? Does the applicant identify and acknowledge potential problem areas/risks and consider alternative tactics?

Responses will be reviewed by an internal ITI panel.

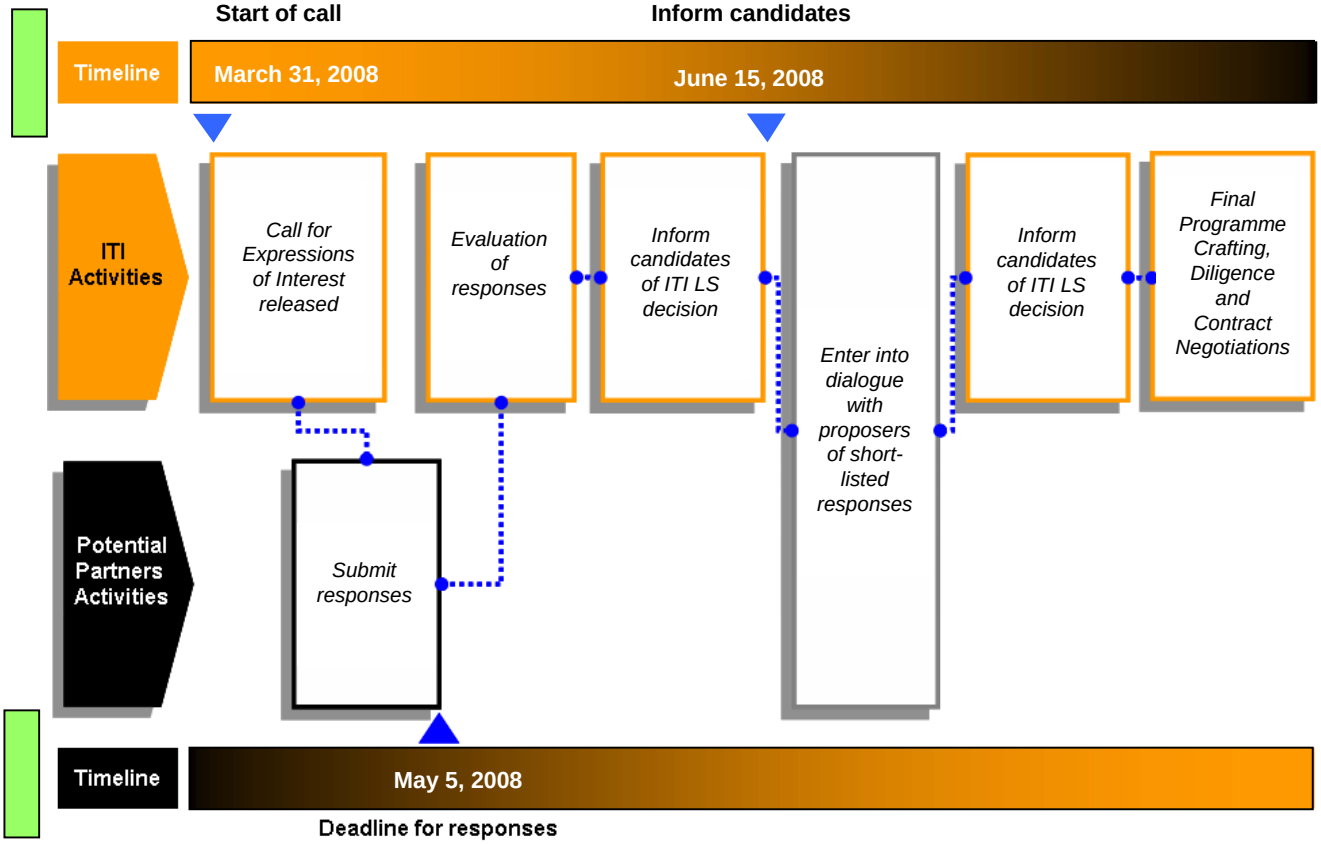
Responses do not need to be strong in all categories to merit inclusion in an ITI programme. For example, ITI may believe that a submission outlines an exciting and highly innovative project but that the proposer could benefit from additional experience or resources to enhance the response. In such cases, we may elect to involve additional third parties with the relevant capabilities to address this requirement.

Where we don't want to play

Our primary driver is the generation of intellectual assets and we are therefore unable to fund the development of what might be a very exciting technology platform but which has limited scope for generating new IA. Additionally, we do not provide funding for 'blue sky' research.

Process & Schedule

The following flow chart illustrates the process and approximate timelines that ITI will follow in assessing responses. Subsequent steps prior to programme initiation are also outlined below.



ITI Life Sciences

Overview

ITI Life Sciences Overview

Established in 2003, ITI Life Sciences is one of the three Intermediary Technology Institutes that make up ITI Scotland. ITI Life Sciences is focused on driving innovation in the Life Sciences sector, through successful and creative investment of £150 million. We identify future global market opportunities and create commercially driven research programmes.

We actively manage programmes with a long term view and look to transcend traditional scientific boundaries with our Research Providers and Commercial Partners to generate market-focused intellectual assets for exploitation by existing and new companies. Our people are highly skilled and mainly drawn from the commercial sector with specialist life sciences expertise. Our investments are based on numerous selection criteria, including the potential for generating new IA, and are intended to generate financial returns and have an economic impact within Scotland. We do not provide grants or fund basic or blue sky research.

To date, we have committed over £50 million in 5 research programmes in the fields of: stem cell technologies; text mining; transgenic screening and safety models; cardiac biomarkers; and lifetime fluorescence assays. We have also produced a range of market Foresighting reports and have a pipeline of future opportunities. In addition to the ongoing benefits of our research programmes, we have an active, international membership of business, research, academic and public sector organisations, who enjoy exclusive access to our market research reports and networking opportunities.

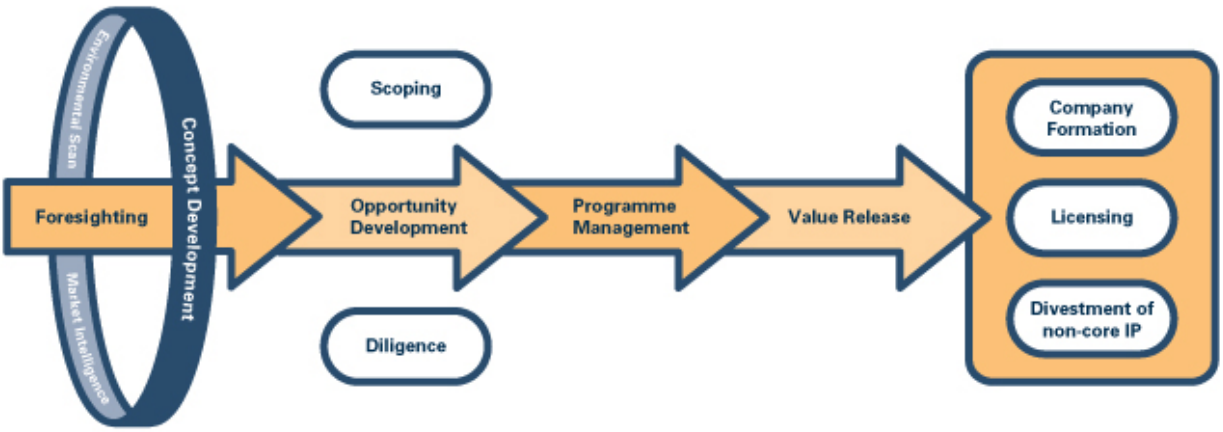
Further information is available on our website (www.itilifesciences.com), along with information on our existing R&D Programmes.

ITI Life Sciences Overview

The ITI operating model is illustrated below. Beginning with a rigorous process of market foresighting and technology assessment, ITI identifies and reviews programme opportunities.

The most attractive opportunities are developed into programmes which are managed by ITI with the aim of generating novel foreground Intellectual Assets (IA) which are owned by ITI LS.

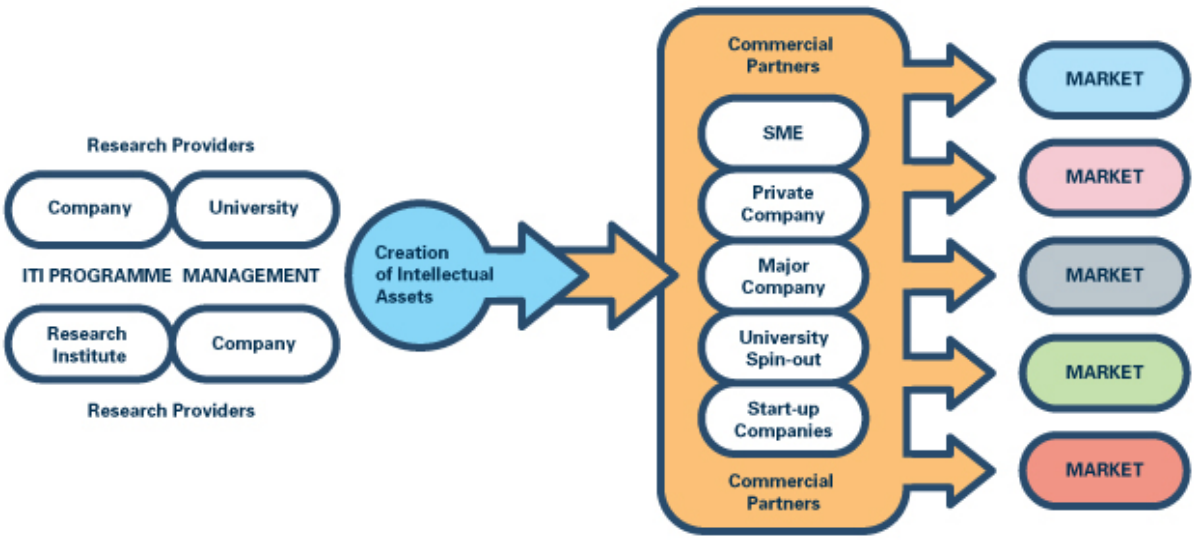
During the final step ITI manages the commercialisation activity through the release of IA, normally through the formation of a company or via licensing.



ITI works with interested parties to identify the most suitable candidates for a programme. This includes carrying out due diligence, negotiating contracts and securing the rights to use background IA, where relevant.

ITI Life Sciences Overview

Collaboration is at the heart of our operating model. There are several ways for companies or organisations to become involved in a potential Gene & Genome Synthesis and Assembly programme:



Research Providers: provide technical expertise and are contracted at commercial rates to develop specific IA. They can be companies, universities or research institutes.

Commercial Partners: Invest some combination of commercial and technical expertise, finance, resources, facilities and potentially also background IA (for which market value will be given). Partners can also be potential licensees of new IA created and/or users of resulting products.

Other Licensees: Much of the IA created will have the potential to be exploited in other fields of use. We will actively seek potential licensees for these technologies and welcome approaches from organisations interested in licensing opportunities.

Who ITI Works With