Grant agreement no. 823712

CompBioMed2

Research and Innovation Action
H2020-INFRAEDI-2018-1
Topic: Centres of Excellence on HPC

D1.4 Innovation Plan

Work Package: 1

Due date of deliverable: Month 7

Re-submission date: 15 February 2021

Start date of project: 1 October 2019 Duration: 48 months

Lead beneficiary for this deliverable: CBK
Contributors: All beneficiaries

Disclaimer

Project co-funded by the European Commission within the H2020 Programme (2014-2020)		
Dissemination Level		
PU	Public	YES
CO	Confidential, only for members of the consortium (including the Commission Services)	
CI	Classified, as referred to in Commission Decision 2001/844/EC	

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1 Version Log

Version	Date	Released by	Nature of Change
V0.1	27/03/2020	Paul Best	Draft 1
V0.2	04/04/2020	Paul Best	Draft for Editorial Review
V1.0	30/04/2020	Paul Best	Formal Issue
V1.1	15/02/2021	Emily Lumley	Revision requested by Commission: A document should be provided clearly outlining the intellectual property strategy of the CoE such as the strategy for licensing of software and other exploitable assets arising from the project. A justification of US partners roles is required as well as the intellectual property conditions set in these collaborations. Risk Management section was also added

2 Contributors

Name	Institution	Role
Paul Best	CBK SciCon	Principal Author
Emily Lumley	UCL	Internal Reviewer
Alberto Marzo	USFD	Reviewer
Marco Viceconti	UNIBO	Reviewer

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3 Definition and Acronyms

Acronyms	Definitions
CoE	Centre of Excellence
cPPP	Contractual Public-Private Partnership
EEAB	External Expert Advisory Board
EsD	Extreme Scale Demonstrator
HPC	High Performance Computing
HTC	High Throughput Computing
IC	Intellectual Capital
IP	Intellectual Property
ISV	Independent Software Vendor
KPI	Key Performance Indicator
SME	Small and Medium-sized Enterprise
UCL	University College London

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4 Public Summary

This document is the Innovation Plan for the Centre of Excellence (CoE) for Computational Biomedicine (CompBioMed), applicable to Phase 2 of the CoE (CompBioMed 2) and building on the innovation infrastructure established during the first 3 years of operation of the CoE in Phase 1 (CompBioMed 1).

The plan outlines how all services, software and know-how developed during the project can be assessed for their innovation potential. It provides guidance to support individual researchers in making that assessment and undertaking any planning of specific exploitation routes.

The innovation management activities during CompBioMed 1 have resulted in a substantial funded programme of development across our core work packages, taking our software and services to full usability by the biomedical community. These work packages will also determine the role our CoE will play in supporting that community in their use in the future.

This plan is complementary to the core funded activities and will maintain the internal infrastructure to support the addition of new results to the innovation process.

5 Introduction

The need to realise the potential of new technologies, develop ideas and make them successful in maximising their impact is woven into the fabric of CompBioMed 2. Critical to this is close collaboration with actors from our user communities and we have built a very substantial network of partners since beginning CompBioMed 1 in 2016. We now have very many collaborators, the majority of whom are more than just temporary in their engagement and who have become Associate Partners working closely with our funded core partners. Our industrial partners range from global pharmaceutical companies to start-up SMEs.

There is substantial innovation potential for our CoE, in part due to the extensive number of private companies participating in the project, both as full and associate partners. We shall seek to realise this potential in several directions, including new opportunities that are now arising in the commercial sector, exploiting High Performance Computing (HPC) and High Throughput Computing (HTC) in order to develop new, different, better and faster solutions than have hitherto been possible. With the requirement from the Commission of an increased focus on Exascale computing, we will be amending some of our activities in line with this. So whilst we are still committed to exploring other directions, these activities will be a lower priority. Some of these openings will emerge directly through the CoE's incubation activities, where we will be preparing the application codes we have developed for wider use outside the CoE, for both open source and commercial use as appropriate. Other openings will come from wider trial and implementation of our knowledge based services, such as medical training, and from services provided by our HPC centre partners to facilitate wider use of resources.

A dialogue has been established with the wider contractual Public Private Partnership (cPPP) for HPC and the newly formed EuroHPC actors to ensure that:

- The approach to Innovation Management in CompBioMed is aligned with the overall strategic objectives of the cPPP

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- Synergistic benefits of co-exploitation with other CoEs and Exascale Demonstrators (EsDs) as they evolve are realised
- Lessons are learned for the establishment of best practice methods for successful innovation across CoEs

Our lead beneficiary UCL (University College London) is also a core partner in the support action FocusCoE and we are using this presence to ensure we align with and contribute to common innovation activities undertaken by FocusCoE.

This plan aims to support CompBioMed's stated impact objectives in European leadership, access to applications & expertise, training and improving European competitiveness. It provides guidance for all project participants in implementing innovation management activities during CompBioMed 2.

This is deliverable D1.4: Innovation Plan, an output of CompBioMed's Task 1.7: Innovation and Stakeholder Relationship Management. Annex A shows the descriptions for Task 1.7 and for deliverable D1.4.

6 Pull-through from CompBioMed 1

During Phase 1 of the CoE (CompBioMed 1), an Innovation Management process was developed to provide a framework for researchers on the project to assess the potential for impact of their results. In this framework, researchers would consider the societal, research, education and commercial possibilities for exploitation and also the capability of their parent organisations to facilitate this exploitation.

Resources to support researchers were put in place to facilitate this, including regular review of exploitation plans, set up and maintenance of a register of incubator/accelerator centres that may be used, a formal Intellectual Property (IP) register recording background, foreground and related third party intellectual property. During CompBioMed 2 we will maintain this infrastructure.

Many of the outcomes during CompBioMed 1 were the result of the planned scientific research and innovation activity within the work packages, and these developments have formed the basis of the work structure for CompBioMed 2. The path to achieving impact is therefore fully embedded in the work programme, as the work packages are fundamentally focused on developing our services and tools to maximise their impact in biomedicine.

Outside of the core work programme, we will maintain the innovation capture and assessment processes we established during CompBioMed 1 in order to support the assessment of any new results that emerge as we progress.

7 Innovation Management and Process

Management activities in the project are designed to promote interdisciplinary entrepreneurial opportunities within the research activities, from invention through to exploitation. For each invention entering the process, the benefits and potential for impact will be assessed, the capacity to exploit from within the project (and/or need for exploitation beyond the project) will be considered and the mechanism for exploitation will be formulated, whether for research, societal or commercial impacts. There is substantial activity within the

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core work programme addressing exploitation routes for software and services already developed and this experience may be used to guide planning for new results. This process will be applied to the anticipated products and services generated from the research:

- Software, by exploiting existing software used by consortium members and associate partners, together with new software developed as a result of collaborative working on the project
- Hardware, by providing access to latest hardware systems and processors
- Medical device manufacturers and pharmaceutical companies, by providing access to simulation techniques
- Compute services and consultancy specific to the domain of biomedicine
- Training courses

The Innovation Management activities will be coordinated across all work packages as a transversal function. There will be regular attendance from the innovation team at internal project work package meetings, led from WP1 (UCL).

The key registers for Incubators/accelerators and for IP will be maintained to support innovation planning.

CompBioMed's Partners and Associate Partners will be actively encouraged to engage with a broad range of actors; government and industry lobbying, Independent Software Vendors (ISVs), the media, promotion, engagement with other Centres of Excellence and relevant academic/industry partnerships. A very substantial part of the core work programme is aimed at dissemination of all our activities and results to these stakeholders.

7.1 Stages in Innovation

The European IPR Helpdesk promotes a 4-stage process for Innovation Management and broadly this will be adopted, suitably adapted to the specific needs and capabilities of the consortium members. The stages are:

- **Secure the foundations** - ensuring the commercial framework is in place and all consortium members are suitably aware, trained and supported in their innovation activities
- **Capture project outputs** – ensuring the mechanisms are in place to ensure beneficial results enter the innovation process
- **Manage and protect project outputs** – ensuring the intellectual capital and property in those beneficial results hold their value for subsequent exploitation
- **Disseminate, exploit and communicate project outputs** – ensuring appropriate effort is expended in order to realize the anticipated research, societal or commercial impact

These stages have been tailored and are expanded in the paragraphs below.

7.1.1 Secure the Foundations

The Consortium Agreement defines the IP access, usage rights and policies (foreground, background, during and after project), together with the IP exploitation policy for the project.

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Many of the Consortium members are research institutions with a commercial focus and as such have good IP awareness. For those individuals that feel they would benefit from further training, guidance should be sought from UCL.

Similarly, a large number of individuals across the consortium membership have been active in high quality research for some time and have received formal training in good research practice. Again, for those that feel they would benefit from additional training, guidance should be sought from UCL.

7.1.2 Capture Project Outputs

Review of research outputs will occur regularly as part of the work package, technical and applications meetings.

Generators of new know-how, Intellectual Capital (IC) and IP will propose those that are candidates to enter the Innovation Management process.

A representative of the innovation team will attend all work package meetings and the regular co-ordination meetings undertaken by the work package leaders to assist consideration of new results.

7.1.3 Manage and Protect Project Outputs

For those results entering the process, an assessment at the appropriate level of the IP and the opportunity will be undertaken, covering:

- Patentability, copyright, confidentiality, including conflict or collaboration with existing IP
- Additional formal protection and proving where it was generated
- Competitive position in light of alternative technologies
- Market(s) available for exploitation
- Innovation potential and its enhancement, together with the means to maximize impact

Consortium members should be aware that within H2020 programmes, measures for protection of IP are an allowable cost.

7.1.4 Exploitation of Project Outputs

For those candidates that show strong potential for real impact, a specific plan will be developed to ensure its exploitation to best effect. Several of the CompBioMed consortium members have established mechanisms for exploitation of research outputs within their organizations and these will be used as a first port of call by the generators of new IP and know-how on the project.

Within the wider pool of partners and associate partners, CompBioMed has extensive experience of exploitation from academic through social to commercial impact.

These specific exploitation plans will cover:

- The extent of exploitation achievable from within the project and what are the paths to further exploitation beyond the project community and project timeline
- The most beneficial business model:
    - Research collaboration

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- Dissemination
- Consultancy
- Licencing
- Incubation
- Spin-out/ start-up
- Joint venture

- Incorporation of and with 3rd party capability/products
- Financial case and investment proposition
- Market assessment and sales & marketing campaign
- Business plan – what/when/how/who

Where required, UCL will match consortium members with the wider expertise available across the project in order to plan and execute exploitation activities.

Annex B is an example form that may be used to record the capture and assessment of results for maximising their exploitation potential.

7.2 Incubators and Accelerators

Incubators are where academic and industry partners will collaborate to exploit HPC and associated e-infrastructure by raising awareness in industry, especially in SMEs, making available and providing support for the use of cutting edge HPC facilities. Our incubator register helps in the final stage of the innovation process in supporting the exploitation planning and subsequently, where appropriate, coordinating the entry of innovation candidates into incubator environments that are suited to their specific exploitation needs.

7.3 Intellectual Property and Intellectual Property Rights

UCL coordinates the management of all Intellectual Property in CompBioMed.

The IP Register contains all information regarding the IC/IP components in the project, with each component defined and detailed within it. The IP Register is available centrally within the CompBioMed intranet and it will be continuously updated as new components are gathered following the various reviews of results.

The project Consortium Agreement is the principal framework for terms of common use, ownership of results and background IP and its commercialization. Consortium members can seek further guidance as necessary from UCL.

In collaborations with the International Partners from the United States an agreement for results generated from the research using a pro forma template agreement will be initiated as this becomes necessary, which will also deal with background IP. Initially both sides of the collaboration are working within open science projects which ensure all results will be shared openly to other partners and the wider world.

8 External Expert Advisory Board

The project has established an External Expert Advisory Board (EEAB) to provide strategic guidance and support in all aspects of the CoE activities including innovation advice where required. During CompBioMed 1 we operated an Innovation Advisory Board, and this was instrumental in determining the methods and tools we would develop to usability in

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CompBioMed 2. As we now have very many lines of development fully planned within our work programme, we expect a lessening need for dedicated innovation advice and more general scientific and business advice and hence the remit of the new advisory board is considerably wider. We will maintain innovation focused members within the EEAB alongside this wider experience.

The members of the board are drawn from within and externally to the project and its composition will change in order to meet the specific needs of the innovation activities as they evolve.

9 Project Key Performance Indicators

All Innovation Management activities will adhere to the overall project philosophy of working towards clear Key Performance Indicators (KPIs). All of our KPIs in CompBioMed 2 are directly aimed at maximising impact.

10 Risk Management

The following possible sources of risks to innovation management have been identified:

a) Consortium Agreement is not sufficient to manage Intellectual Property issues within the Consortium

Probability	Low
Impact	Medium
Risk assessment	Low
Mitigation	Over the four years of CompBioMed and CompBioMed2 we have not required additional documents to guide researchers. If this becomes necessary UCL has a specialist IPR team well versed in IP management, who will work with all partners in the consortium

b) Focusing applications, infrastructure and related services on the Exascale impedes early exploitation and ready adoption in biomedicine

Probability	Medium
Impact	Medium
Risk assessment	Medium
Mitigation	In parallel with efforts towards the exascale, we will continue the development of applications and services that aid the take-up of computational approaches in biomedical science and medical communities

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11 Bibliography

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    - factsheet - IP Management H2020
    - presentation – Invention & innovation in H2020 – Sweeney 2015
    - factsheet – Plan for exploitation & dissemination of results
    - presentation – Impact & innovation in H2020 – Scherer 2014

2. CompBioMed Grant Agreement 823712 - CompBioMed2-H2020-INFRAEDI-2018-2020/H2020-INFRAEDI-2018-1

3. CENELEC – Integrating standards in your Horizon 2020 project

4. Innovation Management standard NPR-CEN/TS 16555-1:2013 en

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Annex A – Extracts from Grant Agreement Annex 1 (Part A) – WP1 Task 1.7/Deliverable 1.4 Innovation Plan

Task 1.7: Innovation and Stakeholder Relationship Management (M7-M48)
Leader: CBK (5 PM); Partners: UCL (2PM), BSC (2 PM), UNIBO (3 PM)
In regard to the innovation managed by this task, the benefits and potential for impact will be assessed, the capacity to exploit from within the project (and/or need for exploitation beyond the project) will be considered and the mechanism for exploitation will be formulated. This process will be applied to the anticipated products and services generated from the research, and in particular for the applications that are incubated in WP5. In addition, innovation activity will be channelled through the engagement, training and sustainability activities in WP6. An innovation management plan will be produced by month 6 of the project. The Innovation Management activities will be coordinated across all work packages as a transversal function. Under the direction of the WP1 managers and with input from the EEAB, we will look over all parts of the project in order to identify new opportunities and to appropriately exploit them during and also after the project's execution. This task will also be responsible for maintaining our links with the ETP4HPC and to participate in EuroHPC in the future. Task 1.7 will oversee the nomination of potential members of the EEAB, who will then be formally voted onto the board by the General Assembly.

D1.4: Innovation Plan (M7)
A detailed innovation plan, to be adhered to by all members of the consortium, to promote the innovation andncommercialisation aspects of this project.

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Annex B - Example Form for Innovation Capture

INVENTION/IDEA	WHAT IS IT?	PRODUCT, METHOD OR SERVICE	COMPBIOMED ACTIVITY	WHICH PARTNER(S) OWN IT?	POSSIBLE ROUTES TO EXPLOITATION	ANY PROTECTION NEEDED?	CURRENT EXPLOITATION PLAN	HELP NEEDED FROM INNOVATION TEAM?

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