Grant agreement no. 823712

CompBioMed2

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

D1.3 Dissemination Action Plan

Work Package:	1	
Due date of deliverable:	Month 4	
Actual submission date:	28 January 2020	
Start date of project:	01 October 2019	Duration: 48 months

Lead beneficiary for this deliverable: *CBK*
Contributors: *CBK, UCL*

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	

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

Table of Contents

List of Tables and Figures

*This project has received funding from the European Union’s Horizon 2020 research and innovation programme under the Grant Agreement No **823712**“*

1 Version Log

Version	Date	Released by	Nature of Change
V0.1	13/12/2019	Hugh Martin	First Draft
V1.0	28/01/2020	Hugh Martin	Final Draft, submitted to the EC

2 Contributors

Name	Institution	Role
Hugh Martin	CBK	Principal Author
Alberto Marzo	USFD	Reviewer
Phillip Fowler	OXF	Reviewer
Emily Lumley	UCL	Reviewer
Peter Coveney	UCL	Reviewer

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

3 Definition and Acronyms

Acronyms	Definitions
CBMC19	CompBioMed Conference 2019
CoE	Centre of Excellence
COST	European Cooperation in Science and Technology
EFPIA	European Federation of Pharmaceutical Industries and Associations
EMA	European Medical Agency
EU	European Union
FDA	Food and Drug Administration
GPCR	G-proten coupled receptor
HPC	High Performance Computing
JLESC	Joint Laboratory for Extreme Scale Computing
LNCC	Laboratório Nacional de Computação Cientifica
MoU	Memorandum of Understanding
NCSA	National Center for Supercomputing Applications
R&D	Research and Development
SME	Small and Medium Enterprise
URL	Uniform Resource Locator
USA	Unites States of America
WP	Work Package

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

4 Public Summary

This deliverable, D1.3: Dissemination Action Plan, is a detailed and comprehensive report on the dissemination actions that will be carried out by the Centre of Excellence, describing our planned channels, events, and strategy in terms of dissemination.

5 Introduction

Dissemination and outreach have played a major, important and successful role in CompBioMed1, and will continue to form an integral part of our work. We will continue to promote the Centre of Excellence's (CoEs) outcomes (publications, codes, education & training, best practices, white papers) to stakeholders, where we have found that it is important to distinguish the type of dissemination by user community. We have identified four major stakeholder groupings; academia, industry, clinical/medical, and the general public. These groups typically require different forms of dissemination, which we will address in our dissemination plan.

A combination of dedicated media work, participation in conferences, preparation and distribution of information, and event organization will ensure we achieve our dissemination objectives. During the CoE, we will maintain the CompBioMed website for external and internal communication and maintain an active social media presence. We will organise showcase events every year involving the whole CoE and ensure a significant presence through our Core Partners at important conferences and events within the (computational) biomedicine field.

The dissemination activities will encompass many different aspects of the use of 'computing beyond the desktop' within the biomedical sciences community. Where possible, we will leverage existing material and courses.

The CompBioMed Consortium will actively seek participation in all the relevant concertation activities organised by and for the Commission in the e-infrastructure domain.

5.1 Dissemination Reports

Two further deliverables will be produced during the CoE's lifetime that will track and report on the dissemination activity in CompBioMed:

- D1.5: Report on Dissemination and Innovation (M25)

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

- D1.6: Final Dissemination and Innovation Report (M44)

Each of these deliverables reports on the dissemination activity produced by the CoE and will trigger updates to this dissemination action plan.

5.2 Dissemination Funds

CompBioMed has allocated funds for the consortium to use for dissemination purposes, these are as follows:

- € 35,000 – for external speaker and running costs for project meetings, these funds are held at UCL
- € 30,000 – for dissemination costs during the CoE, these are held at CBK

6 Target Audiences

Through our dissemination actions, we will disseminate the CoE's outcomes to our various stakeholders, be they members of the scientific community, the clinical community, user communities, vendors, other industries, regulatory authorities, related international projects, or the general public.

The research areas that CompBioMed will investigate and directly impact via the CoE include cardiovascular, neuro-musculoskeletal, and molecular medicine domains that account for a substantial component of biomedicine. However, through our inclusive outward-facing agenda and our strong training activities, we will also actively improve access to such computing applications and expertise in the wider biomedical community, spawning many new collaborative activities and innovative projects which all require access to high end computing capabilities.

Through our CoE, we are nurturing a hub promoting high quality modelling and simulation, including the effective use of high performance computing, across academia, industry and, clinical practice, resulting in wide-ranging impacts. We will also promote computational biomedicine to the general public.

6.1 Academia

CompBioMed's activities will naturally target academia, including students, researchers, and professors. Our dissemination channels, organized events, and event participation (described in Sections 8 and 9) will reach a wide range of academic audiences. This will be strengthened

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

through our academic core partners: University College London, the University of Amsterdam, the University of Edinburgh, SURFsara, Barcelona Supercomputing Center, the University of Oxford, the University of Geneva, the University of Sheffield, Leibniz-Rechenzentrum, University of Bologna, and Universitat Pompeu Fabra.

Our ever-growing list of associate partners also includes many academic institutions, including Brunel University, University of Leeds, the VPH Institute, Zayed University, Heidelberg Institute for Theoretical Studies, University Católica de Murcia, National Academy of Sciences Armenia and the The Hartree Centre along with many others. The strong relationships we have with these partners will be leveraged to disseminate CompBioMed's mission and activity.

6.2 Industry

CompBioMed will target the HPC and biomedical (including pharmaceutical) industries, including software and hardware resource users, resource providers, developers, researchers, CEOs and other leaders.

The CoE will act as an innovation incubator. Academia will work with industry to exploit the CoE's capabilities by raising awareness of and providing support within industrial contexts especially, but by no means exclusively, in SMEs. This is a key activity to ensure the wider impact of HPC in this sector. It will include meaningful intellectual engagement between experts working in academia and users based in industry, with knowledge of HPC and an ability to facilitate access to the appropriate scale of resources required. Our dissemination channels and involvement in events (described in Sections 8 and 9) will also target industry stakeholders.

The pharmaceutical industry is represented by our engagement with core partners Evotec and Janssen, as well as our associate partners AstraZeneca, Institut Curie and GSK. Also included in our consortium; Acellera, an R&D company that provides new technologies for the study of biophysical phenomena; and DNAnexus, a company that provides a global network for sharing and management of genomic data and tools to accelerate genomics.

We will track work done by the ASME sub-committee V&V-40 on the verification and validation of modelling and simulation for the design and assessment of biomedical products, and the related USA Food and Drug Administration (FDA) Fast Track initiative, for the use of computer modelling and simulation results in regulatory processes. We will also monitor the work of the European Federation of Pharmaceutical Industries and Associations (EFPIA) with the European Medicine Agency (EMA) in relation to pharmaceutical products. We will seek to include representatives of these bodies in our activities.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

Through the involvement of our industry partners, we also expect to disseminate the importance of computer based, predictive, multiscale mechanistic modelling and how it can impact on drug design in an increasingly personalised environment, and to co-design industry-oriented added-value workflows that will contribute to the long-term sustainability of the CoE. The importance of serious compute capability is represented through our partnership with Atos.

Despite the inexorable advances in medical science, the cost of discovery and bringing to market of new drugs is becoming prohibitive. The pharma R&D model is under more pressure to implement cost cutting efficiencies than ever before. Compounding this is the trend toward stratification and patient specific medical treatment, meaning for any given ailment one should in future expect to have on offer multiple drugs, each being optimised to a group of individuals, based on their genotypic and phenotypic profile. Our molecular medicine exemplar research strand aims to assist with this new approach, showing how it is becoming possible, based on modern HPC capabilities, to accelerate the discovery of new drugs, while paying close attention to genetic profiling.

Our partner Evotec is a drug-discovery alliance and development partnership company focused on rapidly progressing innovative product approaches with leading pharmaceutical and biotechnology companies. It has several significant long-term discovery alliances with well-established industry players such as Bayer, Boehringer Ingelheim, the CHDI Foundation, Genentech, Janssen Pharmaceuticals, AstraZeneca and Ono Pharmaceuticals. Evotec will be responsible for integrating our state-of-the-art GPCR modelling technology with an HPC platform. This expertise will be made available within the CoE and to third parties seeking assistance from the CoE, and directly from Evotec. The adaptation of these computational drug discovery protocols for HPC will make the GPCR drug-discovery process much more efficient and cost effective, potentially having a large effect on the entire pharmaceutical sector given the central importance of GPCR based drug targets. Evotec will disseminate the results of the work to partner pharmaceutical and biotechnology companies in order to stimulate follow-on research, making written publications and also encouraging company presentations at international conferences.

6.3 The Clinic

CompBioMed will target the clinical stakeholders, including health care professionals such as doctors and surgeons.

We expect that computational modelling of the human body and physiology will impact the field of biomedicine by fundamentally altering the basis for the diagnosis and treatment of disease into a personalised, predictive, participatory and preventative process. In the future, medical innovation will be directed towards optimising treatments using integrated functional

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

simulation *in silico*, assembling a customised computer model of a patient's condition across multiple organ systems and length scales (from molecular to human to population), across timescales from nanoseconds to years, and allowing for the influence of the environment.

The quality and usability of our software will put us in an influential position in terms of promoting modelling and associated software standards internationally. The presence of clinical partners within our consortium will ensure that we exploit any potential impact of these modelling tools in a clinical context. Through integration into clinical decision support systems, computer based modelling and simulation will be able to advise courses of action ahead of treatments, including interventions, which will lead to improved outcomes for patients and enhance the health and wellbeing of the European Union.

An important impact of the *in silico* technologies we are promoting will be to reduce, refine and eventually replace animal experimentation in biomedical research, putting simulation on an equal footing with sequencing and imaging. Various computational biomedicine projects that have developed advanced technologies are struggling to move to clinical trials phases because the technological expertise is lacking from many research hospitals. However, once any one of these computational workflows is established and put in use in a clinical setting, it is possible to amass hundreds of patient-specific simulations. Even if the primary data had to be destroyed on grounds of privacy, these data can be used to identify input parameter distributions that characterise well *in silico* populations, with respect to the particular pathophysiological process captured by the simulation. If these data can be combined with a simulation of an intervention, what we obtain are so-called '*in silico* clinical trials', wherein a new surgical procedure, the insertion of a new medical device, or the assumption of a new drug is simulated within models of hundreds or thousands of "virtual" patients and/or real persons. Likewise, interpolations can be performed over the input parameter distributions that represent absolutely realistic individual patients.

This cutting-edge biomedical technology R&D, involving collaboration between industry and academia, is set to play a key role in promoting EU prosperity and growth. There is real potential to increase the amount of internationally funded R&D taking place within the EU, which could stimulate a reshaping of the EU-wide pharmaceutical industry. In a more specific sense, our CoE will provide a unique opportunity to generate new networks and partnerships and to promote current biomedical research and its applications within drug discovery. A major impact of this research will be the discovery of more effective medicines that are clear of harmful side effects and improve the health and lives of people both within the EU and across the globe.

We will also target the clinic through our associate partner, the Avicenna Alliance. Avicenna is a Support Action co-funded by the European Commission which kicked off its activities in October 2013 with the goal of creating a Roadmap for *in silico* clinical trials. The Avicenna community includes 37 companies, mostly SMEs, which provide *in silico* clinical trials services

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

of some kind to the biomedical industry. Most of these companies should prove to be natural business partners for CompBioMed, as they can market their services in an enhanced manner if supported by our CoE.

In addition, our dissemination channels and involvement in events (described in Sections 8 and 9) will also target clinical stakeholders where appropriate.

6.4 Regions with Fewer HPC Resources

To perform outreach to and engagement with countries and regions within the EU and associated states with fewer HPC resources, CompBioMed will collaborate with the COST (European Cooperation in Science and Technology – see www.cost.eu) platform, through trans-European networking of research. We will seek COST actions of relevance to Computational Biomedicine and collaborate or participate in their activities. COST is based on a European intergovernmental framework for Co-operation in Science and Technology with 36 Member Countries and one Co-operating State. It also encourages active participation by institutions from Near neighbour Countries and International Partner Countries. Near neighbour countries include Armenia, Russia, Ukraine; Lebanon, Libya, Palestine Authority, Jordan, Syria, Tunisia, Egypt and Algeria, while Turkey is currently seeking membership. Bosnia & Herzegovina are also being considered. We shall also work with other funded CoEs and the EXDCI project to achieve impact so as to raise the profile of and facilitating access to HPC in such countries.

BSC is a founding member of the Joint Laboratory for Extreme-Scale Computing (JLESC, http://publish.illinois.edu/jointlab-esc/) which focuses on software challenges arising in extreme scale high- performance computers, including biomedical research. JLESC reach goes well beyond the European scientific ecosystem: it includes international partners such as RIKEN (Japan), KISTI (South Korea), University of Illinois, NCSA and Argonne National Lab (USA). Additionally, BSC takes part in several EU-Brazil joint projects. Notably, it is a partner in the EUBrazil-CloudComputing project, where together with LNCC (Brazil) it works on a use case about the cardiovascular system.

Another important aspect is the wider international outreach of CompBioMed, which is assured through the strong links of many partners with USA, Latin American and South East Asian countries, especially in the biomedical research domain. In addition to the aforementioned projects and initiatives (EU-Brazil, JLESC, etc.) it is also worth mentioning the existence of many direct research links of CompBioMed partners with non-European regions through teaching, training, MoUs, agreements with hospitals and biomedical organizations, hosting of PhD students and postdocs, etc. These links are particularly relevant for the case of less developed Latin American countries.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

6.5 General Audiences

Central to the adoption of Computational Biomedicine in practice will be public and political understanding of its benefits. With this in mind we have created a section on our CoE website dedicated to informing the general public about our vision, research and innovation. In CompBioMed1 we partnered with the London Science Museum to run an event called *Virtual Humans*. The centre piece was the showing of our Virtual Humans film which we produced to share our vision of Computational Biomedicine. The screening was watched by a sell-out audience of 400 people; many more have seen it through additional screenings at film festivals and invited lectures. Events have included public discussion and other activities designed to broaden understanding of Computational Biomedicine and its future impact. By the fourth year of CompBioMed2, we will run another public engagement event, featuring a new movie highlighting developments made in the new project. This will be shown across Europe and also have subtitles and audio in multiple languages.

The CompBioMed Associate Partner, the Science Museum, is a major museum in South Kensington, London. The Science Museum has a substantial online presence on top of its physical location in London where various events and actions connecting science to the general public occur. This presents powerful opportunities for CompBioMed to harness, and we will take full advantage of this relationship.

We will also produce content for popular science magazines such as New Scientist and participate in general public events such as the Bessensap in the Netherlands.

7 Branding and Dissemination Materials

The CompBioMed brand will be used in all of our dissemination materials, be it in the form of leaflets, posters, white papers etc. Templates have been created for each dissemination material type in order to encourage recognition of the CompBioMed brand and therefore the CoE and its aims. The templates are currently available on the CompBioMed website intranet for deliverables to the European Commission, and for presentation slides, more will be added as required. Consortium members are required to inform CBK of content produced using these templates. Consortium members are permitted to modify the templates, but the final product must contain the CompBioMed logo, the statement acknowledging the European Commission, and the European Flag.

Task 1.5 is concerned with the produce of dissemination materials and runs throughout the CoE. During the course of the CoE, CompBioMed will create dissemination materials and make them available via the CoE website. CompBioMed will also disseminate, via the website and other channels, the scientific publications resulting from the CoE's research. Additionally, flyers

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

and posters will be produced and made available at workshops and conferences such as Supercomputing, International Supercomputing, Virtual Physiological Human, and International Conference on Computational Science.

7.1 CoE Logo

The CompBioMed logo continues to adopt the design from the first phase of the CoE. The logo is shown below:

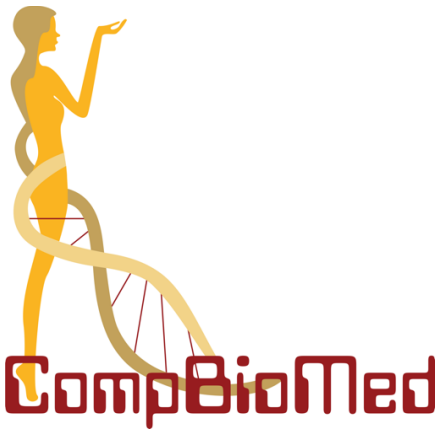

Figure 1: The CompBioMed Logo ('standard' version)

In some circumstances, the text in the logo may need to be relatively larger within the image, for instance when there is not much height available, but plenty of width. For those circumstances, an alternate 'header' version of the logo has been prepared, this is shown below:

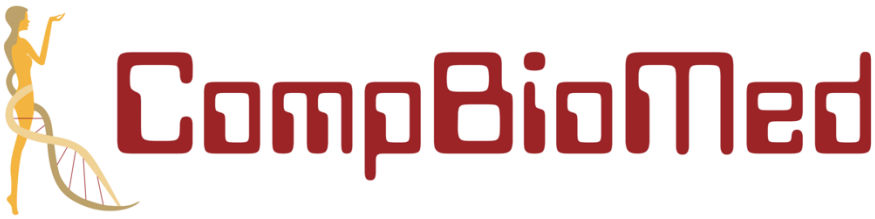

Figure 2: The CompBioMed Logo ('header' version)

The logos are available in .png graphical format and .ai vector format, in high and low resolution.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

7.2 Leaflets

Leaflets have been made and will be handed out to stakeholders at various events (conferences, workshops, seminars etc), with the purpose of making them aware of the CoE or particular aspects of it. In particular, a new leaflet will be produced to summarise CompBioMed and its aims, adjusted to the second phase of the CoE, and it will contain the following:

- CompBioMed logo
- A URL to the CompBioMed website
- A link to the CompBioMed twitter account
- A link to the CompBioMed YouTube account
- The funding line "This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 823712."
- An image of the European flag
- A summary of the CompBioMed CoE
- The expected outcomes
- The expected impact
- Images of CompBioMed research

7.3 Posters

CompBioMed posters will continue to be made to present at events such as conferences and workshops. These will display specific aspects of CompBioMed research and outcomes and will require a CompBioMed consortium member to explain further what appears on the poster, which will contain:

- The CompBioMed logo
- A URL to the CompBioMed website
- The CoE's Twitter handle
- The funding line "This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 823712."
- An image of the European flag
- Images of CompBioMed research
- Summaries of CompBioMed research and outcomes

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

7.4 Presentations

Members of the CompBioMed consortium will attend and present talks at various conferences, workshops and seminars throughout the CoE. Where appropriate, the slides for such talks will contain a section or slide which summarises the CompBioMed CoE, these will contain:

- CompBioMed logo
- A URL to the CompBioMed website
- The funding line "This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 823712."
- An image of the European flag

In other cases, it will be appropriate to theme all of the talk slides as CompBioMed related. In these instances, a template is available that displays the CompBioMed logo on each page, and the rest of the slide aesthetic has been adjusted to match that of the logo, as shown below:

Figure 3: CompBioMed Slide Template

7.5 Newsletters

We will create and release a quarterly printed newsletter that will be made available on the website and distributed to mailing lists and interested parties; it will report on research from partners along with reports on past and upcoming events. We will also produce a monthly e-newsletter (other than in months containing the release of the printed newsletter), distributed via email to our core partners, associate partners and related projects and interested parties.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

7.6 Scientific Papers

Throughout the CoE, the CompBioMed consortium will publish numerous scientific, peer-reviewed papers, conference proceedings, and chapters in books. Such publications will contain the following passage:

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 823712*."*

We will publish in a variety of high-impact journals across the domains in the CoE. Targets include domain journals such as the *Nature Group*, *Journal of Chemical Theory and Computation*, *Journal of Medical Chemistry*, *PLoS* (Public Library of Science), *Computational Biology*, *e-Life*, *Proceedings of the National Academy of Sciences*, *Heart Rhythm*, *American Journal of Physiology*, *Circulation*, *Frontiers in Physiology*, *Journal of the Royal Society Interface*, *Computers in Biology and Medicine*, *Journal of Physiology* or more general computational science / HPC journals such as the *Journal of Computational Science*, *Journal of Uncertainty Quantification*, the *Journal of Supercomputing*, *Supercomputing Frontiers and Innovations*.

All publications will be made open access, at either Green or Gold level. Gold open access is where an author publishes their article in an online open access journal, often paying to unlock open access in a journal (CompBioMed2 has funds for this purpose, held by each partner). In contrast, green open access is where an author publishes their article (often a preprint version) in any journal and then self-archives a copy in a freely accessible institutional or specialist online archive known as a repository, or on a website.

7.7 Videos

We will produce a video in the first two years of the CoE that will demonstrate our Centre's research and describe Computational Biomedicine generally, in the context of how it can aid patients and the general public. This will be a follow up to the IMAX video from the first phase of the CoE called "Virtual Humans", which gives a summary of what Computational Biomedicine is and what it can bring to society. We will continue to disseminate the Virtual Humans video and the follow up produced in the second phase of the CoE throughout the CoE's lifetime as it has proven to make a substantial impact when viewed by audiences of all types including the general public. We will consider editing together bite-sized videos using footage from the two IMAX films in order to create easily digested snippets that will encourage their spreading on social media.

This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No ***823712****"*

We will continue to record CompBioMed talks and training sessions, and upload them to our YouTube channel, along with video recordings or training webinars.

7.8 Other Dissemination Materials

CompBioMed will harness novelty branded items that will be distributed at various events during the CoE. This will act to enhance the awareness of the CoE. Such items may include custom stress balls, pens, mugs, and/or USB sticks, each would be branded with the CompBioMed logo. Branded stress toys in the shape of hearts and brains were popular in the first phase of the CoE.

8 Dissemination Channels

In this section the various dissemination channels available to CompBioMed are described. In general, we aim to make maximum use of already established partner, national, and European dissemination channels such as E-infrastructure specialist groups, thus maximising the impact to cost ratio of our dissemination activities in work package 1.

As a principle of practice, we will employ leverage in dissemination wherever we find the opportunity – in engaging channels and mechanisms previously funded by EU investment, and/or already established in the partner institutions and in professional associations and working groups where the key members of CompBioMed are already present.

Task 1.4: Maintaining the CompBioMed Online Presence is connected to harnessing CompBioMed's online dissemination channels. The task primarily concerns the CoE website, twitter account, and YouTube channel, and runs throughout the CoE.

8.1 The CompBioMed Website

At the core of our dissemination activity is the CompBioMed website, where the CoE is described, its partners are detailed, its activities are reported, helpful contact details are listed, and where there is a repository for CoE-related documents generally. The key CompBioMed services are listed prominently on the homepage: The Visitor Programme, the Training Portal, the Software Hub, and Associate Partner Scheme. Also shown prominently are pages filled with content that is tailored to different visitor types: from Academia, Industry, the Clinic, and the General Public. The website can be accessed at the URL **http://www.compbiomed.eu/**.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

Through WP6 (Task 6.5 Knowledge Transfer), all training materials will be disseminated through a variety of channels including the CoE's Training Portal and Repository, the CompBioMed.eu website and via webinars and open-source repositories such as GitHub. This will maximise the reach of our training programme and our engagement with users at all levels of expertise and provide materials with a proven track record of success to any other organisations interested in adopting these for their own training programmes.

8.2 Social Media

CompBioMed will continue its effective social media presence. At the forefront of this is the CompBioMed Twitter account, which can be found at @bio_comp. The twitter account will be used to disseminate our events and activity, and that of our core and associate partners. We also have a YouTube CompBioMed channel "Computational Biomedicine" where we post videos of CompBioMed talks as well as host our IMAX videos and any other videos we produce. We will also start making further use of LinkedIn and our Computational Biomedicine group to disseminate events and activity, and that of our core and associate partners.

8.3 Mailing lists

CompBioMed2 mailing lists have been set up to aid communication within the CoE, these allow communication to everyone in the consortium and to everyone within a particular work package. We have maintained relevant lists from CompBioMed1 to ensure continuity and will add additional mailing lists as required. The mailing lists are shown below:

All CompBioMed partners:	compbiomed-all@ucl.ac.uk
Executive board:	compbiomed-exec@ucl.ac.uk
Work Package 1:	compbiomed2-wp1@ucl.ac.uk
Work Package 2:	compbiomed2-wp2@ucl.ac.uk
Work Package 3:	compbiomed2-wp3@ucl.ac.uk
Work Package 4:	compbiomed2-wp4@ucl.ac.uk
Work Package 5:	compbiomed2-wp5@ucl.ac.uk
Work Package 6:	compbiomed2-wp6@ucl.ac.uk
Work Package Leaders	compbiomed2-wpl@ucl.ac.uk
Core Partners:	compbiomed2-core@ucl.ac.uk
Associate Partners:	compbiomed-associate@ucl.ac.uk

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

8.4 Related Projects

Related project that we have partnered with and will harness as dissemination channels include:

- BioExcel – Centre of Excellence for Computational Biomolecular Research
- CoeGSS – Centre of Excellence for Global Systems Science
- ComPat – Computing Patterns for High Performance Multiscale Computing
- E-CAM - European HPC Centre of Excellence
- e-COST OpenMultiMed – Open Multiscale Systems Medicine
- EoCoE – Energy orientated Centre of Excellence for Computing Applications
- ESiWACE – Centre of Excellence in Simulation of Weather and Climate in Europe
- ETP4HPC – The European Technology Platform for High Performance Computing
- EU-STANDS4PM – H2020 Coordinating and Support Action
- EXCELLERAT – European Centre of Excellence for Engineering Applications
- EXDCI - The European Extreme Data & Computing Initiative
- HPC Europa 3 – Infrastructure on High Performance Computing
- Human Brain Project - H2020 FET Flagship Project
- MaX – Materials design at the Exascale
- PIC – European ITN on Personalised In-silico Cardiology
- POP - Performance Optimisation and Productivity – A Centre of Excellence in Computing Applications
- The Nomad Laboratory – A European Centre of Excellence
- UKCOMES - UK Consortium on Mesoscale Engineering Sciences
- VECMA – Verified Exascale Computing for Multiscale Applications
- VHeart – Spanish Network of Excellence for Cardiac Computational Modelling
- FocusCoE
- INSIST (thrombectomy is a clinical focus in the CV domain of CompBioMed together with in silico clinical trials, which is one of the aims of INSIST)
- InSilc: In-silico trials for drug-eluting BVS design, development and evaluation

9 Events

CompBioMed will organize and participate in many events throughout the CoE duration, including conferences, workshops, seminars, training events and more. CompBioMed's event involvement is connected to Task 1.6: Conference/Workshop/Event Planning, which runs throughout the CoE.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

9.1 Event Organisation

WP1 will organise several major events during CompBioMed2. Our events are aided by the CoE partnership's strong ties to the computational biomedicine community and knowledge of relevant events in their respective institutions. The CompBioMed workshops have as objectives to promote CompBioMed results and success stories and to provide use cases to interested audiences. Task 1.6 includes the actual workshop organisation, including liaison with the host conference, making calls for papers, reviewing, and so on. We will also include live demonstrator projects, using the most advanced HPC setups possible, to showcase what HPC has to offer to the community. In addition, we will seek opportunities to create special issues of journals related to our organisation, in order to create high impact outreach and dissemination material.

We will organise showcase events every year involving the whole CoE. In the first year we will organise a community engagement event themed around the convergence of HPC and machine learning. Following the CompBioMed Conference 2019 (CBMC19) from the first phase of the CoE, we will hold a follow up conference in the second phase, aiming for the second year of the CoE.

9.2 Event Participation

Work Package 1 is responsible for coordinating the participation of the CompBioMed consortium in various workshops and conferences, where we will promote CompBioMed2 results and success stories for interested audiences, to encourage the development of the Computational Biomedicine community, and to raise awareness of the domain. Events aligning with CompBioMed's aims will be identified and highlighted to the CoE consortium. Where appropriate, attendance at events of significance will be coordinated to include a strong contingent of CompBioMed representatives.

In addition to the foregoing dedicated events we will continue to ensure a significant presence through our Core Partners at important conferences and events within the (computational) biomedicine field. This will include partners' involvement in the conference and partaking in the exhibition opportunities they offer. We will especially focus on biomedical conferences that could disseminate our work to those that, so far, may have had little contact with our field. These include European Society of Cardiology, European Heart Rhythm Association, Gordon Conference on Cardiac Arrhythmia mechanics, BHF Centre of Research Excellence Annual Symposium, European Congress of Clinical Microbiology & Infectious Diseases, Gordon Conference on Drug Safety, World Congress of Biomechanics, European Congress of Biomechanics, the International Society of Biomechanics and Orthopaedic Research Society. In the field of HPC we will participate in Supercomputing, the International Supercomputing

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

Conference, European Conference on Theoretical and Computational Chemistry and many more. We will pay particular attention to event organised by EuroHPC and EPI, including international conferences like EuroHPC Summit Week. The CompBioMed2 Consortium will actively participate in all the relevant activities organised by and for the Commission in the HPC, big data and e-infrastructure domains.

Through WP6 (Task 6.1: Engagement), we will set up a booth at one selected international conference, where we will invite participants to join our community, exhibit available solutions, and provide information on how to engage with CompBioMed.

10 Associate Partner Engagement

CompBioMed's associate partners play a key role in our outreach to the CoE's stakeholders, in additional to providing their own resources and wisdom that will help the CoE deliver its goals. In order to keep the associate partners engaged in the CoE, we will offer various forms of involvement in CompBioMed, liaise with them regularly, and offer certain benefits to their partnership. These include:

- Access to certain HPC resources
- Access to software
- Access to training materials
- Invite to future project meetings and workshops
- Industrial APs invited to be members of the industrial advisory board
- Participation in the Innovation Exchange Programme
- Participation in Incubator Coordination
- Publish a quarterly news bulletin

Our current list of Associate Partners includes:

- Academic Computing Centre Cyfronet AGH
- Aix-Marseille University
- Alces Software
- ANSYS
- AstraZeneca
- Avicenna Alliance
- Birmingham City University
- Brunel University
- Convergence Pharma
- Dassault Systems
- Diamond Light Source
- DiaVita, Life Science
- DNA Nexus

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

- Electric Ant Lab BV
- EnsembleMD
- European Society of Cardiology's e-Cardiology Working Group
- F1000Research
- GSK
- Heidelberg Institute for Theoretical Studies
- Institute of Molecular Biology,
- ITMO University, St Petersburg
- InSilicoTrials
- Institut Curie
- KINDI – Centre for Computing Research
- Leibniz Supercomputing Centre
- Lightox
- Microsoft
- Medtronic
- National Academy of Sciences of Armenia
- Norton Straw Consultants
- Oxford NIHR Biomedical Research Centre
- Pie Medical Imaging (PMI)
- Pozlab, Poznan
- PSNC
- Qatar Robotic Surgery Centre, Hamad Medical Corporation
- Russian-Armenian University (RAU)
- Rutgers University
- Science Museum
- The Foundation for Research on Information Technologies in Society (IT'IS)
- The Hartree Centre
- The Laboratory of Experimental Medicine (LME)
- Universidad Católica de Murcia
- University of Leeds
- University of Southampton, Immunology Group
- VPH Institute
- Zayed University

11 Reporting of Dissemination Activity

In executing CompBioMed's dissemination plans there must be regular communication between all of the partners, in particular via CBK who are managing the dissemination aspects of WP1, to ensure that activity is correctly recorded. The following points define how this is implemented:

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

- In the first instance, key achievements, events, publications, media appearances, and any activities that should be disseminated, should be reported to CBK, directly via email to h.martin@cbkscicon.com.
- In order to monitor the above activity, CBK will use the monthly WP Leader Teleconferences to check on any unreported activity, allowing for it to be disseminated adequately.
- The monthly WP Leader Teleconferences will also be used for CBK to report all dissemination activity from that month to the principle investigator and project manager of CompBioMed.
- The annual dissemination reports will document all CompBioMed dissemination activity from that year and will aid in the annual updating of this document, the CompBioMed Dissemination Action Plan.

Work package leaders will arrange summaries of deliverables and research outcomes to be delivered to CBK for distribution on CompBioMed's dissemination channels.

12 Output Measurement

At the end of the CoE we will want to get an idea of how effective our dissemination output has been. To get performance indicators, we will keep records to gather as much information to measure impact as we can. We will continually research published best practice in impact measurement from Horizon 2020 projects and other sources to establish appropriate metrics for this measurement. Below are the types of output measurement that we will track:

- Number of events participated in
- Number of attendees at our events
- Feedback from workshops and events, e.g. via surveys
- Number of publications
- Publication journal impact factor
- Website stats and social media stats
- Estimated sizes of audiences reached
- Growth in number of end-users of our biomedical applications

13 After the CoE

Through WP6 (Task 6.6: Long-term Sustainability), we will explore various models for the long-term sustainability of the Centre of Excellence, based around: a) the creation of a European Research Infrastructure Consortium funded by private entities, member states, and the European Commission; b) transfer of the portfolio of solutions developed by the CoE to a

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*

group of public or private entities that will continue to provide commercial access to these solutions after the end of CompBioMed2; and c) a hybrid solution, where all solutions are licensed for use by for-profit organisations to commercial entities and made available through a group of HPC national centres to not-for-profit organisations. Once the long-term sustainability strategy is selected, in the last 24 months of the CoE we will fulfil all the necessary legal and organisational arrangements, so that such strategy becomes operational by the end of the CompBioMed2 CoE.

14 Conclusions

We believe that, through our dissemination activities, expected impacts will be accelerated and strengthened. Through the dissemination of CompBioMed research findings and the distribution and awareness of its software to academia, industry, the clinic, and general public alike, we will contribute to the strength and leadership of the EU in HPC technologies, also having an impact on the emerging HPC markets. Through the building of networks between our scientific community and the encouragement of collaboration activities, we will accelerate European excellence in software and algorithms in a multi-disciplinary fashion. Also, we believe that through the effective communication of our work to standardisation bodies, we will be able to jointly develop new standards where they do not exist.

This action plan is a 'living document' that will be updated throughout the CoE, as required. We will adapt the dissemination activity of this Centre of Excellence in order to effectively meet the challenges we face in carrying out our mission.

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Grant Agreement No **823712**"*