

Increasing scientific, technological and innovation capacity of Serbia as a Widening country in the domain of multiscale modelling and medical informatics in biomedical engineering

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BASIC INFORMATION

Call: H2020-WIDESPREAD-2020-5

Type of Action: Coordination and Support Action

- ▶ **Grant Agreement number:** 952603
- ▶ **Duration:** 36 months
- ▶ **Start Date:** 01 October 2020
- ▶ **Requested EU Contribution:** €883,502.50



SGABU Consortium

No	Name	Short name	Country
1.	University of Kragujevac	UKG	Serbia
2.	University of Ioannina	UOI	Greece
3.	Vienna University of Technology	TUW	Austria
4.	Catholic University of Leuven	KUL	Belgium
5.	Coventry University	COVU	United Kingdom



SGABU objectives

Specific objectives



Objective 1

Improve the quality of our research

Objective 1. To develop scientific strategy for research and innovation capacity building in the domain of multiscale bioengineering modelling and medical informatics at UKG.



Objective 2

Make RDI more relevant to the needs of society in Serbia and all relevant stakeholders

Objective 2. To establish a competitive network in the European Research Area and foster long-lasting partnerships with project partners.



Objective 3

UKG to become a national and regional leader in the area of multiscale modelling

Objective 3. To empower research staff at all partner institutions through joint project activities to be more actively engaged in sharing and upgrading innovative knowledge for better social impacts.



Objective 4

Raise the international profile of UKG researchers

Objective 4. To integrate already developed solutions and various datasets related to cancer, cardiovascular, bone disorders and tissue engineering into one multiscale platform.



Objective 5

Become more competitive within ERA

Objective 5. To prepare the ground for future joint and dual PhD studies at UKG.



SWOT analysis

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> ○ Positive reputation in the external community ○ Contribution to proactive partnerships of UKG with other universities, faculties and non-academic sector ○ Well-balanced research group consisting of early stage researchers (ESRs) and experienced researchers Multidisciplinary approach ○ Significant initiatives to develop multidisciplinary study programs on graduate level ○ Knowledge and experience gained in COST SCOPES, NIH, bilateral and multilateral projects, FP7 and H2020 projects 	<ul style="list-style-type: none"> ○ Unstable economic situation ○ Gap in university-business sector collaboration ○ Limited resources and government support for further development of research capacities ○ Limited resources to widen research capacities and increase the number of employees, especially ESRs and PhD students ○ Limited access to high impact journals and top scientific literature ○ Infrastructure not developed enough to support research activities



SWOT analysis

OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ○ Exchange of experience and knowledge with TUW, UOI, KUL and COVU will increase the capacity of UKG in the field of biomedical engineering ○ Creation of an integrated community as a unique structure with reciprocal feedback, useful for all consortium partners ○ Further modernization of study programs ○ Creation of university start-up and spin-off companies in the area of biomedical engineering 	<ul style="list-style-type: none"> ○ Lack of financial resources and government support ○ "Brain drain" of researchers with more attractive opportunities to work abroad ○ Change of national regulation and slow implementation of relevant laws and strategies ○ Limited availability of EU funding programmes in the future



Why multiscale models in biomedical engineering?

- ✓ Multiscale modelling in biomedical engineering provides a new paradigm for future clinical diagnostics systems.
- ✓ Integrative informatics including bioinformatics, imaging informatics, sensor informatics, clinical informatics and public health informatics provides a new approach to the role of informatics and computing in healthcare and life sciences.
- ✓ Education and research in this area is gaining importance globally.
- ✓ UKG and the rest of the consortium partners have recognized enormous RDI opportunities in this field.

The long-term mission of SGABU consortium is to create a sustainable fusion of engineering and life sciences that promote scientific discovery and development of new biomedical technologies through research and education.

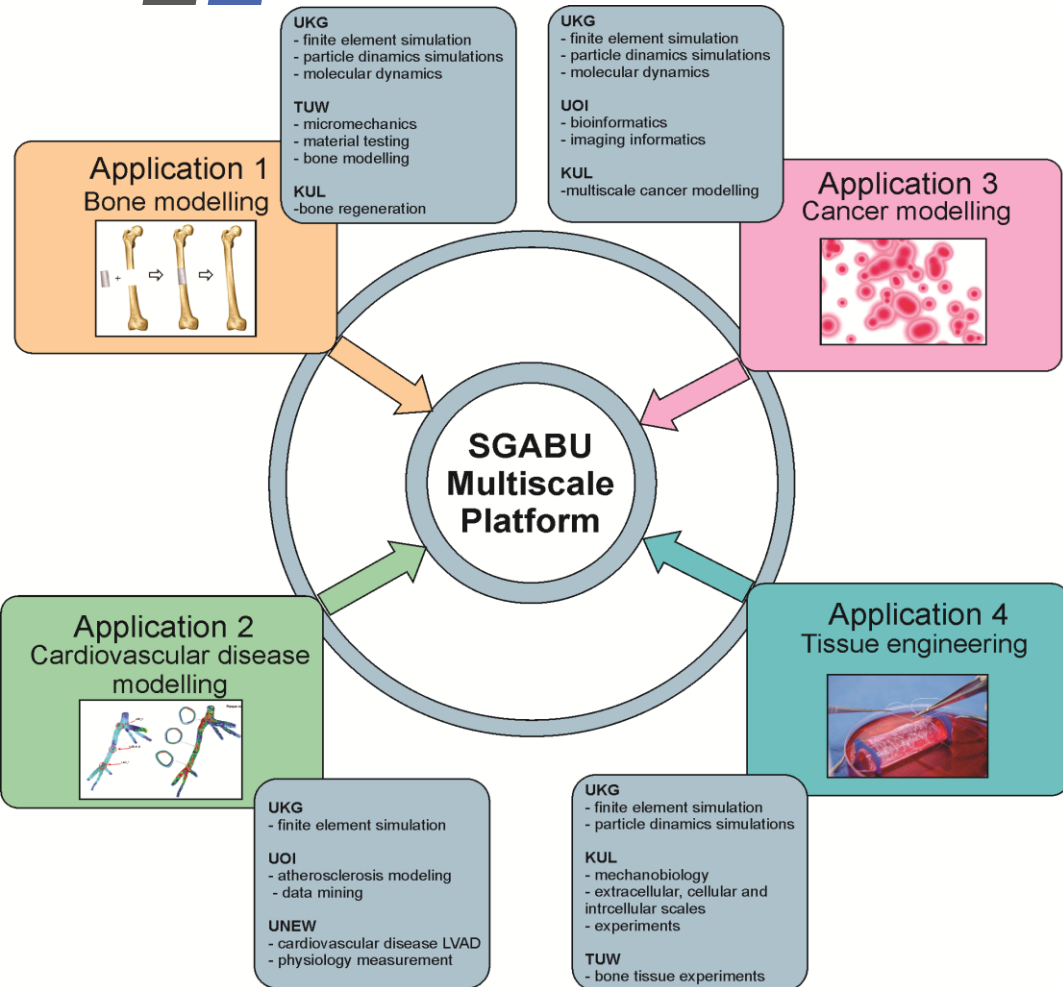


List of Work Packages

WP No	WP Title	WP Leader	Person months	Start month	End month
WP1	Project Management and Coordination	UKG	15.00	1	36
WP2	Dissemination and Exploitation	UKG	11.00	1	36
WP3	Mobilize Knowledge and Expand the Network	TUW	10.50	1	4
WP4	Early Stage Researchers networking and trainings	KUL	27.20	5	36
WP5	Capacity building of the innovative SGABU platform	UOI	21.00	5	18
WP6	SGABU Bioengineering computational platform	UKG	21.70	13	30
WP7	Validation of Bioengineering computational platform	UOI	12.00	25	34
WP8	Upgrading Project Management and Administration Skills	UKG	4.00	3	36
WP9	Ethics requirements	UKG	N/A	1	36
Total			122.40		



Partner contribution



KUL will contribute in the domains of tissue engineering and angiogenesis modelling through the organization of summer schools and workshops and staff exchange.

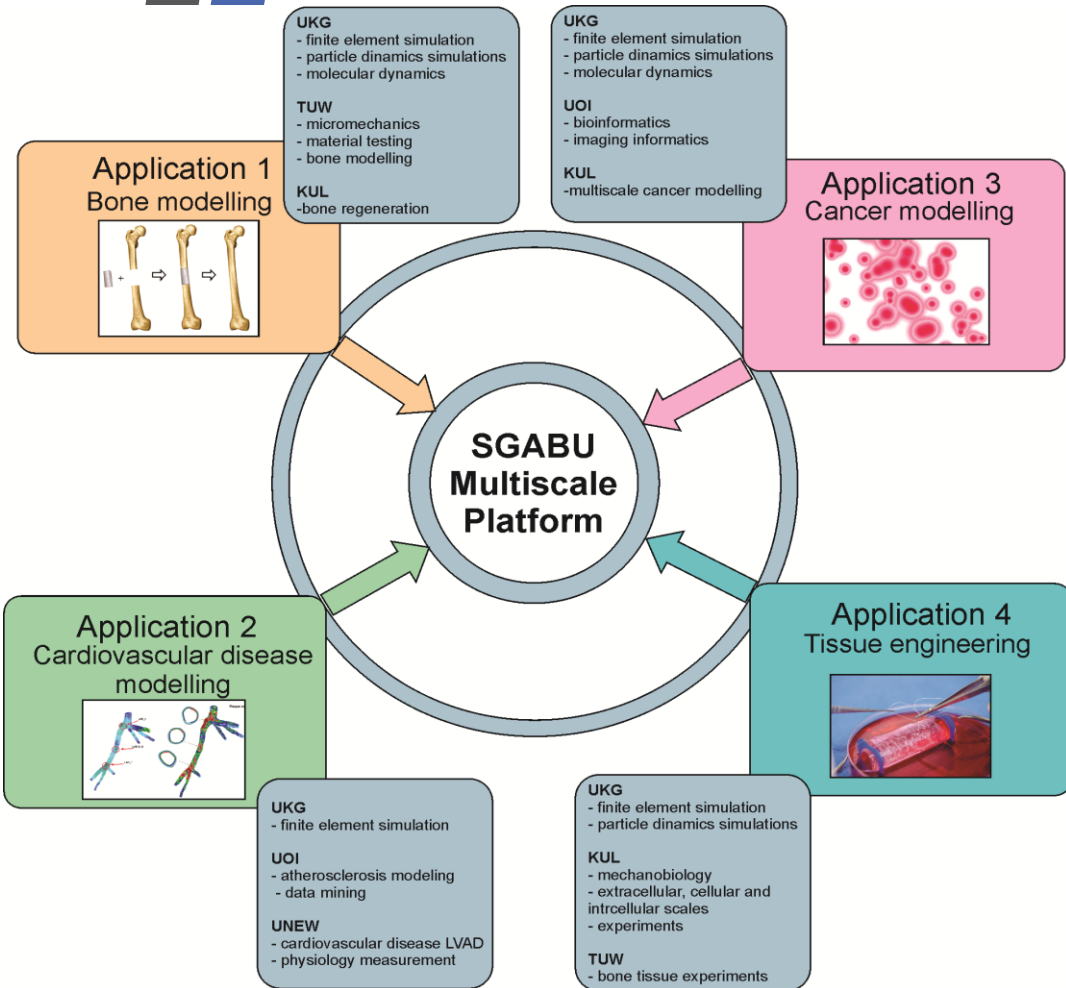
TUW will be responsible for staff exchange, workshops and training courses in the area of multiscale modeling of osteoporosis, bone fracture healing, osteoarthritis and femoral head osteonecrosis, including micromechanics, material testing and bone tissue experiments.

UOI will be responsible for staff exchange, workshops and training courses in the area of multiscale modeling of atherosclerosis, bioinformatics, imaging informatics and data mining.

The main role of **COVU** will be in the area of cardiovascular disease LVAD, as well as in the physiology measurements. COVU will participate in summer schools, staff exchange and workshops, with contribution in collaborative academic and industrial activities. Also, COVU has the role in identification of best practices for building the innovation capacity (Task 3.3).



Basic concept of SGABU platform



- > Collection of clinical and experimental data, analysis and integration into the Bioengineering computational platform
- > Collection of multiscale models and solutions and integration into the Biomedical engineering computational platform
- > Creation of materials needed for high quality learning, training and research
- > Integration of various subsystems into the Biomedical engineering computational platform
- > Testing of multiscale models
- > Evaluation and refinement of the platform to serve learning, training and research purposes in biomedical engineering



Action plan

1st year of the project

- Kick-off meeting
- Data Management plan and Quality plan
- Dissemination plan and beginning of dissemination and communication activities
- Constitution of Advisory Board and Stakeholder Panel
- Two workshops
- Two staff exchanges (UKG to UOI and UKG to KUL)
- First plenary meeting

2nd year of the project

- Intensive network activities
- Intensive dissemination and communication activities
- Development of the Web Platform
- Two coordination meetings
- Two workshops
- Two summer schools
- Two staff exchanges (UOI to UKG and COVU to UKG)
- Two staff exchanges (UKG to UOI and UKG to KUL)

3rd year of the project

- Conference participation and joint publications
- Finalization of the Web Platform
- ✓ Intensive dissemination and communication activities
- Preparatory activities for future joint research activities
- Three coordination meetings
- Two summer schools
- Two staff exchanges (KUL to UKG and UKG to TUW)



Workshops, staff exchange and summer schools

1 st year				
Type	Topic	Venue	Month	Short description
Workshop (WS1)	Biomedical data, models and tools	UKG	M6	Ethical and Legal Issues in Biomedical Data Sharing Security challenges in biomedicine Cloud- and Web- based biomedicine applications Established sharing repositories The VPH-SHARE paradigm Open source in multi-scale modelling: Finite element modelling platforms Segmentation and meshing tools 3D Visualization tools: the ARTreat and SMARTool paradigm
Workshop (WS2)	Multi-scale models coupling	UKG	M10	Tools and methods for models' coupling Discrete Particle Dynamics (DPD) Molecular Dynamics (MD) Micro-macro scale Course-grained method (CG) Finite element + DPD + MD modelling
Staff exchange	Short term staff exchange	From UKG to UOI	M10-M11	ESRs from UKG will spend one month in the lab at the UOI for cardiovascular multiscale modelling
Staff exchange	Short term staff exchange	From UKG to KUL	M10-M12	ESRs from UKG will spend two months at KUL for tissue engineering and angiogenesis modelling



Workshops, staff exchange and summer schools

2 nd year				
Type	Topic	Venue	Month	Short description
Workshop (WS3)	Successful EU project writing	TUW	M13	Calls & themes presentation Partner search Writing skills Elaborating ideas Analysis of successful projects
Staff exchange	Short term staff exchange -5 days	From UOI to UKG	M14	Monitoring and assistance in scientific paper writing Lectures
Workshop (WS4)	Guidelines for innovation improvement	KUL	M17	IPR protection Innovation management Knowledge management Best practice in creation of spin-off companies Entrepreneurial skills
Summer school	Multiscale modelling and bone pathologies	TUW	M19	Characterization of mechanical and fracture properties of bone. Realistic computational models and the influence of molecular and biophysical mechanisms on mechanical behaviour in the case of osteoporosis, fracture and healing.
Summer school	Multiscale modelling and LVAD	COVU	M21	Bridge-to-recovery protocol, LVAD modelling, Physiology measurement
Staff exchange	Short term staff exchange -5 days	From COVU to UKG	M23	Monitoring and assistance in scientific paper writing Lectures



Workshops, staff exchange and summer schools

3 rd year				
Type	Topic	Venue	Month	Short description
Staff exchange	Short term staff exchange-5 days	From KUL to UKG	M25	Experienced research staff from KUL will be appointed for a staff exchange to UKG
Summer school	Multiscale modelling, bioinformatics and data mining	UOI	M29	Multiscale computational models, image processing, bioinformatics and data mining for modelling of cardiovascular diseases and cancer
Staff exchange	Short term staff exchange	From UKG to TUW	M30	ESR from UKG will spend one month at TUW for mechanobiological bone modelling
Summer school	Vessel Mechanobiology	KUL	M32	It will be mostly experimental and with some emphasis on computational modelling



Expected impacts

Upgrading of RDI capacities and research profile of UKG in the domain of biomedical engineering.

The envisaged Bioengineering computational platform will represent the network for future research and innovation activities. It will be further developed and optimized to the needs of different research groups within the project.

By exchanging know-how and expertise in the relevant field of multiscale modelling, researchers will have the opportunity to test, evaluate and demonstrate their research ideas and results and have a valuable feedback form their EU partners.

SGABU project will have a significant impact on UKG mission to:

- 1) Improve the quality of our research**
- 2) Make RDI more relevant to the needs of society in Serbia**
- 3) Become a national and regional leader in the area of multiscale modelling**
- 4) Raise the international profile of our research**
- 5) Become more competitive within the ERA**



Deviation from the work plan

In view of the current COVID-19 crisis, we will act according to the instructions provided by relevant national authorities and Horizon 2020 rules.

Project meetings should, whenever possible, be held online. Tasks, workshops, summer schools and staff exchange can be shifted and reorganized. UKG as the coordinator will keep track of the changes so they can be reported in the periodic reports. If major changes are required now, the Project Officer should be notified in due time.



THANK YOU
FOR YOUR ATTENTION!

