

 <p>St George's University of London</p>	 <p>CLBME</p>	 <p>biomedical engineering</p>
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COLLABORATION AGREEMENT

DATE:

7th June, 2010

PARTIES:

- (1) **ST GEORGE'S HOSPITAL MEDICAL SCHOOL** (Trading as St George's, University of London) of Cranmer Terrace, London, SW17 0RE ("**SGUL**"); and
- (2) **CENTRE OF BIOMEDICAL ENGINEERING AT THE BULGARIAN ACADEMY OF SCIENCES** of bl. 105 Acad. G. Bonchev Str., Sofia 1113, Bulgaria ("**CBE-Centre**"),
- (3) **INSTITUTE OF BIOMEDICAL ENGINEERING – NATIONAL RESEARCH COUNCIL (ISIB-CNR)** Corso Stati Uniti, 4 – 35127 Padova, Italy ("**ISIB-Centre**"),

Hereinafter referred to as the Party/ies

BACKGROUND:

- (A) SGUL has experience and expertise in the field of Cardiac and Vascular Sciences
- (B) ISIB-Centre and CBE-Centre have experience and expertise in the field of Biomedical Engineering and computerized electrocardiography.
- (C) The parties wish to collaborate and develop research relating to the analysis of digital electrocardiographical data. The Collaboration will involve research at the establishment of both Parties on the terms set out in this Agreement.

- (D) The Parties wish to specify with respect to the Project, the relationship among the Parties, in particular concerning the organisation of the work, the management of the Project, the rights and obligations of the Parties, and the authorship relating to any publication

OPERATIVE TERMS:

1 Definitions

- 1.1 In this Agreement unless the context otherwise requires the following words or expressions have the following meanings:

“Background Information” means all technical know-how and information known to the parties at the date of this Agreement of a confidential nature not in the public domain, together with all Intellectual Property owned or licensed to the parties at the date of this Agreement and, following the date of this Agreement, all technical know-how and information of a confidential nature (prior to it coming into the public domain) and all Intellectual Property owned by or licensed to the parties other than Foreground Information;

“Commencement Date” means 1st July 2010;

“Confidential Information” means all commercial, technical, financial and other information or data in whatever form of a confidential nature known to either party and disclosed by one party to the other pursuant to this Agreement and for the purpose of performance of the Project, including (without limitation) each party's business and commercial affairs (including any trade secrets), any confidential processes, methods or technologies, and the details and results of the Project;

“Data” means the information, results, data, analyses, laboratory reports and notes of whatever nature arising from the Project whether in human or machine readable form and whether stored in writing or electronically or in any other form;

“Force Majeure” means any cause preventing any party from performing any or all of its obligations under this Agreement which arises from or is attributable to acts, events, omissions, accidents or circumstances beyond the reasonable control of the party so prevented, including (without limitation) any strike, lock-out or other industrial dispute, war, riot, civil commotion, malicious damage, compliance with any law or governmental order,

rule, regulation or direction, accident, breakdown of plant or machinery, fire, flood, explosion, storm or other act of God, shortage of materials, labour or manufacturing facilities or default or delay of suppliers or sub-contractors;

“Foreground Information” means all technical know-how, information, (including all materials, products, methods, processes and apparatus) and Intellectual Property directly arising out of the Project;

“Intellectual Property” means all copyright, patents, inventions, discoveries, improvements, utility models, trade marks, trade names, service marks, design rights, database rights, semiconductor topography rights, know-how and all other similar proprietary rights (whether registered or not) as may exist anywhere in the world and all applications and rights to apply for or for the protection of any of the foregoing;

“Principal Investigator” means Dr Velislav Nikolaev Batchvarov (SGUL)

Professor Ivaylo Hristov (CBE-Centre)

Dr. Giovanni Bortolan (ISIB-Centre)

“Project” means the Project entitled “analysis of digital electrocardiographical data” as described in Schedule 1 to this Agreement, under the direction of the Principal Investigator in the Centre for Infection at SGUL;

“Project Plan” means the plan of respective objectives, studies and activities of the parties, time scale for their commencement and completion, and accompanying budget, as set out in Schedule 1 to this Agreement, or any revision thereto which has been agreed between the parties pursuant to this Agreement.

1.2 In this Agreement (except where the context otherwise requires):

- 1.2.1 any reference to a clause or schedule is to the relevant clause or schedule of or to this Agreement;
- 1.2.2 the clause headings are included for convenience only and shall not affect the interpretation of this Agreement;
- 1.2.3 use of the singular includes the plural and vice versa and use of any gender includes the other genders;

- 1.2.4 any reference to "persons" includes natural persons, firms, partnerships, companies, corporations, associations, organisations, governments, states, foundations and trusts (in each case whether or not having separate legal personality);
- 1.2.5 any reference to a statute, statutory provision or subordinate legislation ("legislation") shall (except where the context otherwise requires) be construed as referring to such legislation as amended, re-enacted or consolidated and in force from time to time provided that no such amendment or modification shall apply to the extent that it would impose any new or extended obligation, liability or restrictions on, or otherwise adversely affect the rights of, any party to this Agreement.
- 1.3 The schedules form part of this Agreement and shall have effect as if set out in full in the body of this Agreement and any reference to this Agreement includes the schedules.
- 1.4 In the event of any conflict between the provisions of this Agreement and the provisions of any Schedule to this Agreement, the provisions of this Agreement shall prevail.

2 Collaboration

- 2.1 The parties shall collaborate in the performance of the Project in accordance with the terms of this Agreement, commencing promptly after the Commencement Date.
- 2.2 SGUL , CBE-Centre and the ISIB-Centre shall use reasonable endeavours to carry out their respective obligations in relation to the Project as set out in the Project Plan hereto.
- 2.3 SGUL shall direct the SGUL-Principal Investigator to carry out such of SGUL' responsibilities under the Project Plan as appropriate, and shall use its reasonable endeavours to retain the employment of the SGUL-Principal Investigator in this capacity during the term of the Project. If at any time during the Project the SGUL-Principal Investigator leaves the employment of SGUL or is unable or unwilling to carry out Project responsibilities delegated to him by SGUL, SGUL shall notify CBE-Centre and ISIB-Centre and use reasonable endeavours to provide a mutually acceptable replacement. If SGUL is unable to secure a replacement, either SGUL or CBE-Centre or the ISIB-Centre may terminate this Agreement by giving 30 days' written notice to the other and without any liability on the part of SGUL in respect of its inability to secure such a replacement.

- 2.4 The parties may at any time amend the Project by mutual written agreement pursuant to the procedure for review of the Project Plan as set out in clause 3.

3 Project management

- 3.1 The Principal Investigator shall be responsible for managing the Project.
- 3.2 The SGUL, CBE and ISIB Principal Investigator shall meet on a regular basis, at places and times of common agreement, but not less than once every three months.
- 3.3 SGUL shall provide to CBE-Centre and the ISIB-Centre a written report relating to the Project, in such forms and detail as agreed, at least once in every 12 months and a final report within 60 days of completion of the Project.
- 3.4 SGUL will make available to CBE-Centre and to the ISIB-Centre copies of the Data on a regular basis at intervals to be agreed.

4 Project funding

- 4.1 At present there is no specific funding for this Project, however both Parties will continue to attempt, individually and jointly, to secure appropriate financial support.
- 4.2 In the event either or both Parties obtain funds to support this project, both Parties agree to revise this agreement to account for the financial change.

5 Publicity and publications

- 5.1 All publications generated from this collaborative project will be jointly authored.
- 5.2 The CBE-Centre and the ISIB-Centre shall not use the name of SGUL, or of any of its employees (including the Principal Investigator) or consultants, in any publicity, advertising or news release or in any article or other publication without the prior written consent of SGUL.
- 5.3 Subject to clauses 7, 8, 5.1, 5.3 and 5.4, CBE-Centre and the ISIB-Centre hereby agrees that the Principal Investigator and/or other employees or members of SGUL shall be permitted in accordance with normal academic practice to present at symposia,

conferences, national or regional professional meetings or seminars, and to publish in journals, books, theses or dissertations, or otherwise of their own choosing, methods and results of the Project.

- 5.4 The CBE-Centre and the ISIB-Centre shall not prevent such presentation or publication provided that it has been furnished copies of any proposed publication or presentation at least 30 days in advance of submitting or making such proposed publication or presentation to a journal, editor, audience or other third party or parties (as the case may be). The CBE-Centre and the ISIB-Centre are entitled to object in writing to SGUL to such proposed publication or presentation within the period of 14 days from receipt of the same where the material in question contains or refers to a subject matter which is patentable or which is commercially sensitive.
- 5.5 In the event that the CBE-Centre or the ISIB-Centre make such an objection, SGUL shall refrain from making such publication or presentation for a period not exceeding 90 days from the date of the receipt of such publication or presentation by the CBE-Centre and the ISIB-Centre, in order to enable a patent or other form of Intellectual Property protection with respect to the information proposed to be published or presented.

6 Intellectual property rights

- 6.1 All Background Information used or supplied under this Agreement shall remain the property of the party introducing the same.
- 6.2 All Foreground Information shall be jointly owned by SGUL, CBE-Centre and ISIB-Centre equally (irrespective of the respective contributions made by each party). In order to ensure each party's ability to comply with this clause, each party shall be responsible for securing title in and to such Foreground Information as is created by its own employees, contractors and other agents.
- 6.3 Each party shall promptly inform the other of any Foreground Information which consists of results, designs, discoveries, inventions or other matters which it believes may form the subject of an application for a patent or other form of Intellectual Property protection.
- 6.4 If both parties wish to apply for a patent or any other Intellectual Property protection relating to the Foreground Information, SGUL shall promptly prepare, file and prosecute such application in the joint names of the CBE-Centre and the ISIB-Centre and SGUL in those countries where the parties believe there is a reasonable prospect of a viable commercial return and thereafter maintain any resultant registrations. The Parties shall co-operate in

relation to such application(s) and agree a joint ownership agreement and commercialisation plan outlining management and responsibilities of each Party, including division and share of costs.

- 6.5 If the Centre is unable or unwilling to so-operate in making or maintaining an application for a patent or other form of Intellectual Property protection relating to the Foreground Information it shall notify SGUL in writing of this as soon as reasonably possible. Upon receipt of such notification SGUL may at its option assume, with effect from the date of receipt of the notification, all responsibilities, costs and expenses for the application and prosecution of such application(s) or maintenance of the Intellectual Property in question and the CBE-Centre and the ISIB-Centre shall provide its reasonable co-operation in relation thereto.
- 6.6 SGUL may use any such joint foreground Intellectual Property for the purposes of teaching and non-commercial research.

7 Confidentiality

- 7.1 Any Confidential Information shall, from the date of disclosure and for the duration of the Project and for a period of 5 years thereafter, be treated by the party receiving such Confidential Information in strict confidence and with the same care and discretion to avoid disclosure to any third party as the party receiving the Confidential Information uses with its own similar information which it does not wish to disclose.
- 7.2 Neither party shall use the other party's Confidential Information for any purpose other than to perform its obligations and/or exercise its rights under this Agreement.
- 7.3 Neither party shall disclose the other party's Confidential Information to any third party other than to such of its officers, students and/or employees who need to know such information for the purposes of this Agreement.
- 7.4 The confidentiality obligations of this clause 7 shall not apply to any Confidential Information which:
- 7.4.1 at the time of disclosure is in the public domain;
 - 7.4.2 after disclosure hereunder is published or becomes part of the public domain through no fault on the part of the recipient party, but only after such Confidential Information has become part of the public domain;

- 7.4.3 was already known to or in the possession of the recipient party at the time of disclosure hereunder and which is not otherwise known or held by the recipient party under any obligation of confidence; or
- 7.4.4 was received by the recipient party after the time of disclosure hereunder from a third party who does not owe any duty of confidence to the disclosing party.
- 7.5 Each party shall ensure that its officers, employees (including, in the case of SGUL, the Principal Investigator) and consultants comply with the provisions of this clause 7.
- 7.6 Nothing in this Agreement shall restrict any party from disclosing any part of all of Confidential Information pursuant to a judicial or other lawful government order to do so but only to the extent required by such an order, where the party the subject of the order has given as much notice to the other party as is reasonably practicable.

8 Data Protection

- 8.1 The Centre agrees that, in relation to the obtaining, using, disclosing and other processing of any personal data (as defined in the Data Protection Act 1998) pursuant to this Agreement, it shall at all times comply with the requirements of the Data Protection Act 1998, and shall indemnify and keep indemnified SGUL and against all actions, claims, demands, expenses, liabilities, damages and/or losses arising out of or in connection with the breach of its data protection obligations.

9 Exclusion of warranty

- 9.1 SGUL undertakes to use reasonable endeavours to ensure that its work relating to the Project is carried out in accordance with accepted scientific principles and standards but makes no representation or warranty, express or implied, that the results of the Project or any Foreground Information shall be accurate or fit for any purpose, and accepts no responsibility for any use which may be made of any Foreground Information arising from the Project.

10 Liability and indemnity

- 10.1 SGUL does not accept any liability (except in the case of death or personal injury caused by its negligence or fraudulent misrepresentation) for any use (including exploitation) which the CBE-Centre and the ISIB-Centre may make of any Foreground Information, or for any costs, actions, claims, demands, liabilities, expenses, damages or losses (including without

limitation consequential losses and loss of profit and all interest, penalties and professional costs and expenses) arising out of or in connection thereof.

- 10.2 The CBE-Centre and the ISIB-Centre shall be liable for and shall indemnify and keep indemnified and hold harmless and defend SGUL, its employees (including the Investigator), agents and consultants from and against all costs, actions, claims, demands, liabilities, expenses, damages or losses (including without limitation consequential losses and loss of profit and all interest, penalties and professional costs and expenses) arising out of or in connection with the CBE-Centre's or the ISIB-Centre's negligence, default or breach of the terms of this Agreement or arising from or in connection with the Project.

11 Term and termination

- 11.1 The Project shall commence on the Commencement Date and, subject to valid termination in accordance with this clause, shall continue in force for a period of five (5) of years.

- 11.2 This Agreement may be terminated with immediate effect:

11.2.1 by either party if the other commits a material or persistent breach of any term of this Agreement and which (in the case of a breach capable of being remedied) shall not have been remedied within 30 days of a written request to remedy the same;

11.2.2 by either party if an interim order is made, or a voluntary arrangement approved, or if a petition for bankruptcy order is presented or a bankruptcy order is made against the other party or if a receiver or trustee is appointed of the other party's estate or a voluntary arrangement is approved or an administrator is appointed in respect of the other party whether by order of the Court or by any other means a receiver or administrative receiver is appointed over any of the other party's assets or undertaking or a resolution or petition to wind up the other party is passed or presented (otherwise than for the purposes of reconstruction or amalgamation), or if any circumstances arise which entitle the Court or a creditor to appoint a receiver, administrative receiver or administrator or to present a winding up petition or make a winding up order;

11.2.3 by SGUL pursuant to clause 2.3;

11.2.4 by SGUL pursuant to clause 4.2.

12 Consequences of termination

- 12.1 Any termination of this Agreement shall be without prejudice to any other rights or remedies either party may be entitled to under this Agreement or at law.
- 12.2 The termination or expiry (howsoever caused) of this Agreement shall not affect the operation of clauses 5.1, 6, 7, 10, 11 and 13 of this Agreement which shall remain in full force and effect.
- 12.3 On termination of this Agreement (by either party for whatever reason):
- 12.3.1 SGUL shall return or arrange for the collection of:
- (i) all unused or surplus materials, preparations and/or samples provided by the Centre pursuant to the Project; and
 - (ii) any equipment owned by or proprietary to the Centre provided to SGUL for the sole purpose of the Project;
- 12.3.2 each party shall immediately cease all use of the other party's Confidential Information and shall within 7 days of the date of termination, deliver to the other party all Confidential Information in its possession or control which has been received from the other party pursuant to this Agreement, save that, subject to the prior written agreement of the other party, in relation to any such information which is mingled with its own information or is carried on irremovable computer media, it may destroy the information irrecoverably and provide a certificate together with evidence satisfactory to the other party that it has done so.

13 Force Majeure

- 13.1 If any party is prevented or delayed in the performance of any of its obligations under this Agreement (other than any obligation to make any payment due in respect of services already tendered) by Force Majeure, it shall forthwith notify the other party in writing of the nature and extent thereof.
- 13.2 Subject to notification pursuant to clause 13.1, none of the parties shall be deemed to be in breach of this Agreement, or otherwise be liable to the other, by reason of any delay in performance, or non-performance, of any of their obligations under this Agreement to the extent that such delay or non-performance is due to any Force Majeure; and the time for performance of that obligation shall be extended accordingly.

- 13.3 If the Force Majeure in question prevails for a continuous period in excess of 3 months, SGUL or the Centre may terminate this Agreement on 30 days' written notice in which case none of the parties shall have any liability to the other parties except that the parties' rights and liabilities which accrued prior to such termination shall continue to subsist.

14 General

- 14.1 Each of the parties acknowledges that in entering into this Agreement it has not relied on any representation or warranties about its subject matter except as expressly provided by the written terms of this Agreement.
- 14.2 A provision of this Agreement or any right created under it cannot be varied except in writing and signed by each of the parties.
- 14.3 The failure or delay of either party to exercise or enforce any right under this Agreement shall not operate as a waiver of that right or preclude the exercise or enforcement of it at any time or times thereafter.
- 14.4 Any notice to be given under this Agreement shall be in writing and delivered by prepaid registered post or facsimile to the other party at the address set out in this Agreement. Notices are deemed to have been given:
- 14.4.1 if sent by registered post from within the United Kingdom, three business days after posting (or seven business days if posted from outside the United Kingdom); and
- 14.4.2 if sent by facsimile, at the time the facsimile is received shown in the transmission report as the time that the whole facsimile was sent unless received after 5pm in the place of receipt or on a non-business day, in which case the notice is deemed to have been given at 9am the next business day.
- 14.5 The CBE-Centre and the ISIB-Centre may not assign, transfer or sub-contract all or any of its rights or obligations under this Agreement without the prior written consent of SGUL.
- 14.6 This Agreement constitutes the entire agreement and understanding of the parties and supersedes all negotiations, understandings, or previous agreement between the parties relating to the subject matter of this Agreement.

- 14.7 The Contracts (Rights of Third Parties) Act 1999 shall not apply to this Agreement, and nothing in this Agreement shall confer or purport to confer on any third party any benefit or any right to enforce any term of this Agreement.
- 14.8 If any provision of this Agreement shall be held to be unlawful, invalid or unenforceable, in whole or in part, under any enactment or rule of law, such provision or part shall to that extent be severed from this Agreement and rendered ineffective as far as possible without modifying or affecting the legality, validity or enforceability of the remaining provisions of this Agreement which will remain in full force and effect.
- 14.9 Nothing in this Agreement is intended to or shall operate to create a partnership between the parties or to authorise any party to act as agent for any other party, and no party shall have authority to act in the name or on behalf of or otherwise to bind any other party in any way (including but not limited to the making of any representation or warranty, the assumption of any obligation or liability and the exercise of any right or power).
- 14.10 This Agreement shall be governed and construed in accordance with English law and shall be subject to the non-exclusive jurisdiction of the English Courts.

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Schedule 1

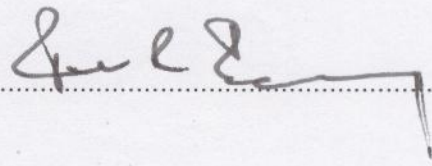
Project and Research Plan

The collaboration between the Division of Cardiac and Vascular Sciences at St. George's University of London, the Centre for Biomedical Engineering at the Bulgarian Academy of Sciences and the Institute of Biomedical Engineering – Italian National Council of Research ISIB-CNR Padova began in May 2007 when scientists from the three institutions analysed a digital electrocardiographic (ECG) database collected at St. George's University of London. We demonstrated for the first time some effect of ventricular premature beats on the recovery properties of subsequent beats, which may have important implications for ECG assessment of the effect of various drugs. The results were presented at the 34th annual Computers in Cardiology Conference in Durham, North Carolina, USA, 30th September – 3rd October, 2007 (1). In 2008 we performed computerised analysis of another digital ECG database acquired at St. George's and described new aspects of the physiological adaptation of ventricular electric recovery to changes in heart rate and body positions. The results were presented at the 35th annual Computers in Cardiology Conference, in Bologna, Italy, 14-17 September (2).

We are currently planning a collaborative study of the beat-to-beat variations of the ECG during diagnostic ajmaline test in patients with suspected Brugada syndrome. The project again will utilise a large digital ECG database acquired at St. George's, which will be analysed with a software programme developed in the Centre for Biomedical Engineering in Bulgaria and in the ISIB-CNR institute. The results are expected to have direct clinical importance for the diagnosis and risk stratification of patients with the Brugada Syndrome. Some preliminary results were presented at the 36th annual Computers in Cardiology Conference, in Park City, Utah 13-16 September 2009 (3). Depending on the results, we are planning to submit an application for funding to some of the research-supporting institutions in the UK.

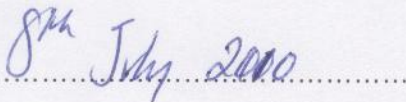
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- (1) Batchvarov VN, Christov I, Bortolan G, Simova I, Camm AJ. Post-Extrasystolic Changes of the Vectorcardiographic T Loop in Healthy Subjects. *Computers in Cardiology* 2007;34:451-454.
 - (2) Batchvarov VN, Bortolan G, Christov I. Effect of Heart Rate and Body Position on the Complexity of the QRS and T Wave in Healthy Subjects. *Computers in Cardiology* 2008; 35:225-228.
 - (3) Batchvarov VN, Christov I., Bortolan G, M. Govindan M., Camm AJ, Behr ER. Automatic Assessment of Right Ventricular Repolarization Dispersion during Diagnostic Ajmaline test for Sustected Brugada Syndrome. *Computers in Cardiology* 2009;36:297-300.

Signed by Mark Bery for and on behalf of)
ST GEORGE'S UNIVERSITY OF LONDON)
(trading as ST GEORGE'S, UNIVERSITY)
OF LONDON)

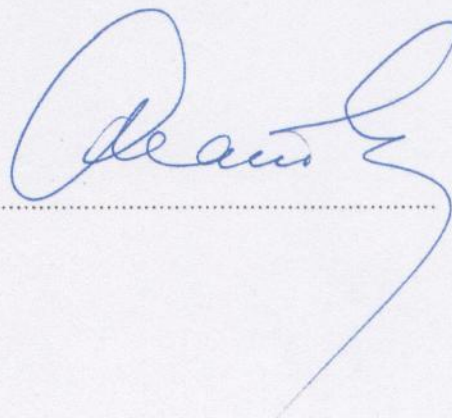
A handwritten signature in black ink, appearing to read 'Mark Bery', written over a dotted line.

Mark Bery, Director of Finance & Resources

Date:

A handwritten date in blue ink, '8th July 2000', written over a dotted line.

Signed by Mikhail Matveev for and on behalf of)
CENTRE OF BIOMEDICAL ENGINEERING)
AT THE BULGARIAN ACADEMY OF)
SCIENCES)



.....

Prof. Mikhail Matveev, Director of Centre of
Biomedical Engineering.

Date:

08. 06. 2010
.....

Signed by Grandori Ferdinando for and on
behalf of **Institute of Biomedical Engineering**
ISIB-CNR , Padova, Italy

Date:

.....

Prof. Grandori Ferdinando, Director of Institute
of Biomedical Engineering ISIB-CNR

Date

ISIB - CNR
ISTITUTO DI INGEGNERIA BIOMEDICA
C.so Stati Uniti, 4 - 35127 PADOVA

21 GIU. 2010