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2. TRANSLATION AWARD
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This form must not be used for preliminary applications for Seeding Drug Discovery. Preliminary application forms for Seeding Drug Discovery are available at http://www.wellcome.ac.uk/doc_WTX026865.html **and must be completed in conjunction with the information for applicants available at** http://www.wellcome.ac.uk/assets/wtx027225.doc

Applicants for a Translation Award are expected to first submit an Executive Summary as a preliminary application. Applicants for a Strategic Translation Award should first contact Technology Transfer before submitting any summary or preliminary application.

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Employing organisation	3D Metrics
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Title of Project

A '3d Metric' Approach to Biomedical Modelling and Simulation

Introduction

The '3d metric' approach is based upon 10 years of private and independent research into the foundations underlying mathematics, metrology and visualization through programming. The result is a '3d metrology' that is scale independent and visualization techniques that are independent of application.

The independence of scale solves problems derived from current incongruities between macro- and micro-phenomena, be they physical, chemical or biological in nature.

The independence of application offers a 'virtual' approach to modelling as a complement to hands-on experiments.

The '3d metric' approach proves particularly relevant for time related data since scale independence implies independence of length scales and time intervals.

Modelling static structures in space has therefore become as much a new possibility as simulating dynamic processes over short, medium or long time intervals.

Furthermore, the '3d metric' approach is based on light such that photons become the ultimate measure for the essence of life forces and the compatibility with biological processes.

Applied to the biomedical context, the '3d metric' approach offers light as a new benchmark for testing states of illness and wellness as well as simulating biological and chemical processes over extremely short as well as rather long time horizons.

Proof of concept has been achieved by applying the '3d metric' approach to financial data over a variety of time intervals. As a consequence, the senior developer of a major hedge fund company has translated the approach into a 'projection engine' which can project data derived from any other application over any time interval.

This core engine which predicts future developments from historic data, could become one of the '3d metric' tools available to the 'virtual guinea pig' which would be the outcome of this proposal.

Objectives of the proposal

1. to prove the '3d metric' principles for measuring '3d qualities' in chemical interactions and biological processes such as tissue repair and gerontology
2. to demonstrate 'bio-compatibility' as reference measure for biomaterials
3. to establish a group of academic and pharmaceutical advisors as 'strategic co-developers' and 'beta testers' for customising the '3d metric' approach to particular biomedical application areas
4. to turn existing software designs into web services so that users can
    a. visualise molecules from biochemical data bases in '3d metric' ways for cross-disciplinary knowledge bridging to deepen understanding and postulate outcomes
    b. compare their characteristics with the theoretical standards of bio-compatibility
    c. classify molecules according to newly quantifiable '3d qualities' to be able to assess phase transitions and structural changes in time and space.

What are the expected healthcare benefits?

1. A new framework for the classification, characterisation and visualization of biochemical structures and processes at nano, micro, meso and macro scales – using input from data bases, microscopes and any other 'machine vision' device

2. New software tools for the development of preventive and curative drugs
3. New web-based methods for assessing the bio-compatibility of existing and future drugs, food supplements and other chemicals.

Briefly, what is the current progress of the technology?

1. Ten years of private and independent research have established the '3d metric' framework of measuring as a measurement theory which is scale independent, i.e. it can be applied at any length scale and at any time interval, defining new '3d measures' of new emerging qualities across biochemistry
2. Visio diagrams and other files constitute the software designs of such a fundamental nature that they are applicable to any numerical data, be it of physical, chemical, biological or biomedical relevance.
3. As proof-of-concept, prototype software demonstrates new mathematical methods for interpolation, extrapolation and layering multi-dimensional data.
4. As reduction-to-practice, the senior developer of a major hedge fund company has created a 'projection engine' for forecasting numerical values from any historical data – again independent of the time intervals examined and of the area of application to be tailored for – with an accuracy well above average.
5. As commercial application, a German company is co-developing the software necessary to translate surface measurements taken by 'machine vision' into 3d measurements – thus establishing 'machine 3d metrology'.

Competitive advantage and IP position

Independence of length and time scale and of application are so abstract and fundamental that they are difficult to grasp on an intellectual level. But in technological terms, it means the generic approach to software as a general framework – such as Excel which can be used for 'anything'. This implies huge commercial potential with lots of vertical markets as opposed to the conventional supply of lots and lots of specialist software.

Biomedical expertise could be drawn from:

Prof. Vadgama, Materials Research, Queen Mary's University

Prof. Mikhailovsky, Molecular Biophysics, University of Brighton

The Director of Inhalation Science from Glaxo Smith Klyne is a prime example for the challenge of this proposal. While he publicly announced looking for new mathematical modelling, he could

not bridge the gap between their specific medical needs with my mathematical and metrological approach.
LGC (Laboratory of the Government Chemist) is potentially an excellent partner, but I would look to the Wellcome Trust to help form such a consortium.

The IP is proprietary to the mathematician and software designer Sabine K McNeill.

Why, at the end of any Trust funding, will the technology be attractive to a follow-on funder?
Because the potential for follow-on products and software services will unfold and become very apparent during the first round of funding.

Approximate budget/financial requirements from the Trust

1. Programming and supervision	
a. Core processes	90,000
b. Web services	20,000
c. 3D visualization	20,000
2. Subscriptions to data bases	2,500
3. Access to machine vision output	2,500
4. Biomedical Expertise	20,000
5. TOTAL	155,000