The VPH Portal

www.vph-portal.eu

THE VPH TOOLKIT: SAVED!

The VPH NoE Toolkit – your VPH guide to the Tools, Models and Data that you need for your workflows – is a powerful resource that can speed your access to the essential VPH facilities your project is missing.

We're delighted that the Toolkit has been migrated to the new **VPH portal** in an improved, searchable format that maximises utility and minimises the time needed to locate resources.

- FIND TOOLS, MODELS AND DATA
- SEARCH BY DOMAIN AND TASK
- LOCATE DISCIPLINE-SPECIFIC ITEMS
- USE RANKINGS TO HELP SELECTION

Got something to add to the Toolkit? Get in touch immediately with the portal team to share your resources with the widest VPH audience: vph@sheffield.ac.uk

The VPH Portal

The new online home of the VPH

The VPH NoE has recently launched a new web facility for the VPH Community, the **VPH Portal**.

This fresh resource will provide news, information, resources and links to every important online facility of interest to the VPH community. With the latest details of VPH developments and access to thousands of VPH colleagues across the world, the portal should be your first destination for information every day.

The NoE's visible legacy

The NoE has done remarkable work in building the VPH community and promoting the VPH message, and its legacy can be seen in the tools created, the partnerships established and the educational developments that live on. Perhaps the finest result is the introduction of this enduring web presence which, under the care of the VPH Institute, will be nurtured to remain at the forefront of VPH relevance.

The new VPH portal: vph-portal.eu

The VPH Portal provides a complete service

- *VPH guides for all possible visitors*
- *Resources for the community*
- *News on all topics and opportunities*
- *Events, activities and results*
- *Project descriptions and facilities*
- *The latest on funding and employment*
- *Careers and education*
- *Your own home page: configure it freely*

vph-portal.eu : Visit the new VPH portal

Contact the portal team: vph@sheffield.ac.uk

Textbook: Computational Biomedicine

www.vph-noe.eu

A BOOK FOR ADVANCED UNDERGRAD AND POSTGRADUATE STUDENTS

This book addresses many of the issues faced by the community behind the VPH. We'll cover diverse areas including:

- MULTI-SCALE MODELLING: FROM THE GENE TO THE ORGAN
- STANDARDS
- CLINICAL WORKFLOWS
- CLINICAL VALIDATION
- ...AMONGST MANY OTHER THINGS!

Our book will be published by Oxford University Press and should be ready in 2013

NOT SCIENCE FICTION, JUST A LOT TO KNOW

Although VPH technology seems science-fiction, it is here to stay. What is a hypermodel? How do we build it? What are the standards? How do we validate these models? All of this and more will be addressed in this book

WHEN?

We have a commitment with Oxford University Press to deliver the book during early spring 2013

Contents:

- Understanding the genotype-phenotype relationship
- Bridging the gap between clinical phenotypes and omics data
- Image and signals based modelling
- Standards
- Modelling Cell function
- Tissue/organ level modelling
- Multiscale modelling
- Workflows: Principles, tools and clinical applications
- Distributed biomedical computing beyond the desktop
- Toward deployment: technical assessment and clinical assessment.
- Managing security and privacy on patient-data sharing platforms

Contacts: Prof. Peter Coveney & Dr. Vanessa Díaz | University College London | p.v.coveney@ucl.ac.uk; v.diaz@ucl.ac.uk

Clinical Education

www.vph-portal.eu

VPH and Clinical Education

The VPH NoE has joined forces with members of AMEE (www.amee.org) to deliver VPH research project outputs in forms suitable for clinical education. This has encompassed:

- Identification of target educational groups
- Definition of clinical learning objectives
- Development of tools for educational exposure
- Evaluation of effectiveness

We're delighted to offer this expertise to vph projects wishing to target dissemination to the heart of the clinical community.

Have an interest in exposing your VPH research to a clinical audience? Get in touch with the WP4 team for further information: vph-noe-wp4@ucl.ac.uk

Virtual Patients for Clinical Education

The AMEE community has significant experience in the use of "Virtual Patients" to deliver education to a clinical audience through an interactive environment. The electronic nature of such resources promotes sustainability and use within a range of learning environments. Examples of previous application of Virtual Patients can be found in the eViP project repository: http://www.virtualpatients.eu. Contact the WP4 team to learn more about how your VPH project could translate to a Virtual Patient application.

Delivery Across the Clinial Curriculum

The VPH NoE has targeted outputs throughout the clinical curriculum, from use of VPH models to illustrate fundamental physiology at undergraduate level, to specialised training for registrar trainees. Further information is available from the WP4 team and at the VPH Portal: www.vph-portal.eu.

eViP website

Exemplar educational contexts:

- *Cardiovascular models to illustrate physiological concepts to undergraduate medical students*
- *Enhanced Virtual Patient case for AV-fistula creation to explore VPH model outputs*
- *Simulated imaging data for registrar training in radiology*

VPH Roadmap

www.vph-noe.eu

The VPH vision

What have we achieved so far?
- Standards, tools and services
- Dissemination, training and outreach
- International connections
- VPH-I projects

What are the biomedical science challenges?
- Molecular systems biology
- Genomic networks – models and databases
- Metabolic networks – models and databases
- Physiology – models and databases
- Incorporation of ageing
- A VPH platform for a new drug targeting paradigm
- Phenomics technology – a new innovation arena?

What are the healthcare challenges?
- The needs
- Personalised, predictive and integrative healthcare
- Access to clinical data
- EC regulatory policy
- Impact analysis

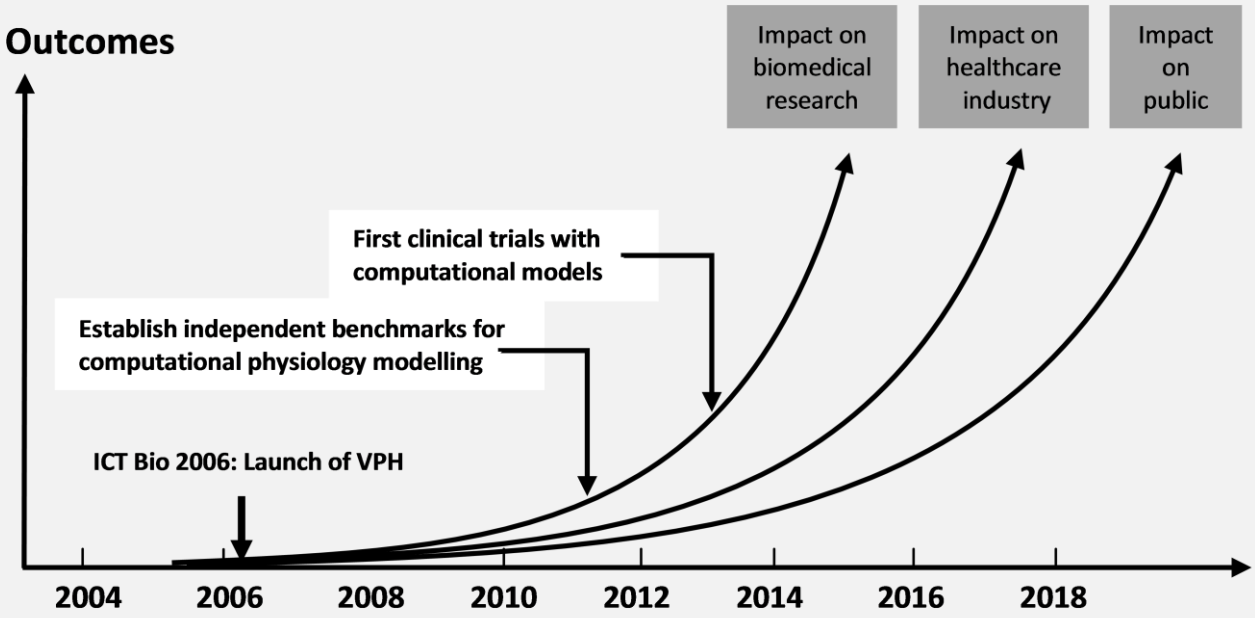
What are the ICT challenges?
- Model/data encoding standards: model reproducibility
- Model reduction and multi-scale model integration
- Dealing with probabilistic and stochastic processes
- Image-based integrative prototyping frameworks
- Multiscale simulation and visualization software
- Supercomputing challenges
- Informatics and "big-data"
- Data security

A strategy for the VPH

A Vision and Strategy for the VPH

A Roadmap document outlining a shared vision and strategy for the VPH Project, together with the past achievements of the many VPH-funded projects, was written by a group of 24 members of the VPH-NoE. The first Roadmap was published in 2010, the second in 2010 and the third in 2011. The contents are indicated in the panel to the left and predicted outcomes below.

Virtual Physiological Human
network of excellence



Contact: P. Hunter | University of Auckland, NZ, and Oxford University, UK. | p.hunter@auckland.ac.nz

VPH Institute

Building the Virtual Physiological Human

www.vph-institute.org

WHO ARE WE?

THE **VIRTUAL PHYSIOLOGICAL HUMAN (VPH) INSTITUTE FOR INTEGRATIVE BIOMEDICAL RESEARCH** IS A NOT-FOR-PROFIT ORGANISATION WHOSE MISSION IS TO ENSURE THAT THE VPH IS FULLY REALISED, UNIVERSALLY ADOPTED AND EFFECTIVELY USED BOTH IN RESEARCH AND CLINIC.

OUR GOAL

IN THE NEXT FIVE YEARS THE LARGE BODY OF TECHNOLOGICAL RESEARCH AROUND THE CONCEPT OF THE VPH HAS TO COALESCE INTO A WHOLE NEW *IN SILICO* MEDICINE, WHERE COMPUTER SIMULATIONS WILL HAVE A TRANSFORMATIONAL IMPACT.

THE VPH INSTITUTE WILL WORK TO ENSURE THAT THE NECESSARY INVESTMENTS IN:

- RESEARCH AND TECHNOLOGICAL DEVELOPMENT;
- TRAINING;
- CLINICAL ASSESSMENT

ARE MADE TO MAKE THIS REVOLUTION POSSIBLE!

SUBSCRIBE TO THE VPH NEWSLETTER:

A free monthly electronic publication keeps you updated on everything relevant for the VPH community:
www.vph-institute.org/subscribe_newsletter

WHAT IS IN OUR PLANS?

- The VPH PORTAL, to make available to the VPH community the latest release of the VPH technology and all the tools developed so far: all in one place, easy to access and use: www.vph-portal.eu!
- The VPH CONFERENCE, a biannual conference series focused on VPH research and its clinical application;
- The POLICY AFFAIRS WORK GROUP, VPH Experts and professional in policy affairs that constantly elaborate the policy communication toward the various stakeholders;
- The STANDARDISATION & INTEROPERABILITY WORK GROUP, involved in proposing the new technical standards and interoperability protocols required by a collaborative development of the VPH technology;
- A VPH HEALTH ECONOMCS OBSERVATORY, to monitor the development of VPH technologies from a cost-benefit perspective.

VPH Institute
Building the Virtual Physiological Human

Join us:

General or Supporting members? Visit our website and choose your level of involvement. www.vph-institute.org/membership

Membership:

Today we have over 70 members which are academic, clinical and industrial key players in the area of in silico *medicine.*

Our Supporting Members for 2012/13:

INRIA (FR), King College London (UK), Norwegian University of Science and Technology (NO), Ospedale Pediatrico Bambino Gesù (IT), Universidad de Zaragoza (ES), Università di Roma "Foro Italico" (IT), University College London (UK), University of Auckland (NZ), Virtual Liver Network (DE) and University of Sheffield (UK).

News: www.vph-institute.org/news
Email: manager@vph-institute.org

Twitter: www.twitter.com/VPH_Institute
YouTube: www.youtube.com/user/VPHINST/

VPH Initiative

2008 - present

VPH Network of Excellence (2008-2012)

Rallying point for VPH research: establish and disseminate best practice (conferences, networking, Exemplar Projects, support training for VPH research (textbook and Education Engine), VPH ToolKit web portal.

www.vph-noe.eu contact: miriam.mendes@ucl.ac.uk

Action-Grid International cooperative action on grid computing and biomedical informatics between the European Union, Latin America, the Western Balkans and North Africa. (2008-2010)

Now completed - International collaboration in medical/biomedical Informatics and grid technologies to promote the interface between ICT and nanotechnology.

www.action-grid.eu. contact: diglesia@infomed.dia.fi.upm.es

AirPROM Airway Disease PRedicting Outcomes through Patient Specific Computational Modelling (2011-2016)

Building an airway model validated by omic data and ex vivo models at the genome-transcriptome-cell-tissue scale and by CT and functional MRI imaging.

www.airprom.european-lung-foundation.org/ contact: marie.adams@le.ac.uk

ARCH Patient specific image based computational modelling (2008-2011)

Now completed - developed clinical decision support tools based on patient-specific predictive modelling of vascular pathologies.

www.vph-arch.edu contact: aremuzzi@marionegri.it

ARTreat Multi-level patient-specific artery and atherogenesis model for outcome prediction (2008-2013)

Developing a predictive tool for atherosclerotic plaque progression and a treatment decision support system based on multiscale patient specific models of atherosclerotic disease.

www.artreat.org/ contact: oberpar@tin.it

ContraCancrum Clinically Oriented Translational Cancer Multilevel Modelling (2008-2011)

Now completed - used multiscale modelling techniques to simulate patient specific cancer treatment outcomes.

http://www.contracancrum.eu/ contact: kmarias@ics.forth.gr

DISCIPULUS Digitally Integrated Scientific Data for Patients and Populations in User-Specific Simulations (2011-2013)

Developing a roadmap on the "Digital VPH Patient" which is a method of integrating diverse computational models and individual data to produce a computational patient avatar..

www.digital-patient.net/ contact: v.diaz@ucl.ac.uk

euHeart Personalised and intergrated cardiac care (2008-2012)

Now completed - developed open source codes and multiscale/multi-physics models of heart electromechanics for clinical cardiac diagnostic and device development applications.

www.euheart.eu/ contact: nic.smith@comlab.ox.ac.uk

FUSIMO Patient specific modelling and simulation of focused ultrasound in moving organs (2011-2013)

Developing patient specific modelling and simulation of focused ultrasound in moving organs, such as the liver.

www.fusimo.eu contact: christoph.schulte@zv.fraunhofer.de

GRANATUM A social collaborative working space semantically interlinking biomedical researchers, knowledge and data or the design and execution of in-silico models and experiments in cancer chemoprevention (2011-2013)

Developing a social collaborative working space semantically interlinking biomedical researchers, knowledge and data for the design and execution of in-silico models and experiments in cancer chemoprevention.

www.granatum.org/index.html contact: wolfgang.prinz@fit.fraunhofer.de

HAMAM Highly Accurate Breast Cancer Diagnosis through Integration of Biological Knowledge, Novel Imaging Modalities, and Modelling (2008-2011)

Now completed - established a database of curated and annotated imaging data and software tools for breast cancer diagnosis.

www.eibir.org/cms/website.php contact: horst.hahn@mevis.fraunhofer.de

IMPPACT Image-based Multi-scale Physiological Planning for Ablation Cancer Treatment (2008-2011)

Now completed - developed multi-scale physiological and numerical model for patient specific prediction of RFA treatment for liver cancer..

www.imppact.eu/ contact: marina.kolesnik@fit.fraunhofer.de

INBIOMEDvision Promoting and Monitoring Biomedical Informatics in Europe (2011-2013)

Europe-wide initiative monitoring the evolution of the Biomedical Informatics field and addressing its scientific challenges through collaborative efforts.

www.inbiomedvision.eu contact: info@inbiomedvision.eu

INTEGRATE Driving Excellence in Integrative Cancer Research through Innovative Biomedical Infrastructures (2011-2014)

Developing flexible infrastructure components and tools for data and knowledge sharing and large-scale collaboration in biomedical research.

www.fp7-integrate.eu contact: anca.bucur@philips.com

MSV Multiscale Spatiotemporal Visualisation (2010-2012)

Developing visualization of multiscale data through open-source extension to the visualization toolkit (vtk).

www.msv-project.eu contact: d.testi@scsitaly.com

MySPINE Functional prognosis simulation of patient-specific spinal treatment for clinical use (2011-2014)

Establishing a prototype computing platform with a graphical user interface for clinical settings and a patient-specific database of the lumbar spine.

www.myspineproject.eu contact: coordinator@myspineproject.eu

NeoMARK ICT Enabled Prediction of Cancer Reoccurrence (2008-2010)

Now completed - implemented collaborative research networks and tools for the early detection of oral squamous cell carcinoma.

www.neomark.eu contact: coordinator@neomark.eu

NMS Physiome VPHOP-SIMBIOS cooperation: Tools to develop the NeuroMusculoSkeletal Physiome (2010-2013)

Transcontinent NeuroMusculoSkeletal physiome activity in pursuit of personalized, predictive and integrative musculoskeletal medicine.

www.nmsphysiome.eu/ contact: andrea.rizzi@ior.it

PASSPORT Patient Specific Simulation and PreOperative Realistic Training for liver surgery (2008-2011)

Now completed - developed an open source multiscale framework for diagnostics and surgical training in the liver, based on modelling liver cell regeneration.

www.passport-liver.eu contact: luc.soler@ircad.u-strasbg.fr

p-medicine From data sharing and integration via VPH models to personalised medicine (2011-2015)

Creating an infrastructure to facilitate the translation from current practice to personalized medicine. The project is designed to bring VPH methods to three sets of clinical trials treating various cancers (leukaemia, breast cancer, Wilm's tumour).

www.p-medicine.eu contact: c.hahn@eurice.eu

preDiCT Computational Prediction of Drug Cardiac Toxicity (2008-2011)

Now completed - developed promising new drug safety biomarkers, produced the fastest computation of ventricular excitation and most detailed models of heart geometry..

www.vph-predict.eu/ contact: katherine.fletcher@cs.ox.ac.uk

PredictAD From Patient Data to Personalised Healthcare in Alzheimer's Disease (2008-2011)

Now completed - developed an evidence based statistical framework for diagnosis of Alzheimer's disease.

www.predictad.eu contact: jyrki.lotjonen@vtt.fi

RADICAL Road mapping technology for Enhancing Security to Protect Medical & Genetic Data (2008-2010)

Now completed - developed a roadmap of security and privacy issues for VPH applications and best practices for medical and genetic data protection in distributed environments.

www.radicalhealth.eu contact: vbonoris@bionova.gr

RICORDO Researching Interoperability using Core Reference Datasets and Ontologies for the Virtual Physiological Human (2010-2012)

Now completed - supported VPH resource sharing by providing a semantic interoperability framework that links physiology-related data and model resources.

www.ricordo.eu contact: bdb@ebi.ac.uk

Sim-e-Child Grid-Enabled Platform for Simulations in Paediatric Cardiology – Toward the Personalized Virtual Child Heart (2010-2012)

Now completed - a grid-enabled platform for large-scale simulations in paediatric cardiology.

www.sim-e-child.org contact: michael.suehling@siemens.com

SYNERGY-COPD Modelling and simulation environment for systems medicine (COPD as a use case) (2011-2014)

Modelling and simulation environment for systems medicine and decision support for clinicians using chronic obstructive pulmonary disease as a demonstration case.

www.Synergy-COPD.eu contact: lceccaroni@bdigital.org

TBIcare Evidence-based Diagnostic and Treatment Planning Solution for Traumatic Brain Injuries (2011-2014)

Creating an objective and evidence-based solution for management of TBI by improving diagnostics and treatment decisions for an individual patient by matching a patient's individual data with the injury's characteristics.

www.tbicare.eu contact: jaana.heino@vtt.fi

THROMBUS A quantitative model of thrombosis in intracranial aneurysms (2011-2014)

Developing a simulation model to predict how cerebral aneurysms may occlude after the insertion of a stent.

www.thrombus-vph.eu contact: guy.courbebaisse@insa-lyon.fr

TUMOR Transatlantic TUmour MOdel Repositories (2010-2013)

Developing a clinically oriented semantic-layered cancer digital model repository from existing EU projects that will be interoperable with the US grid enabled semantic-layered digital model repository platform at CViT.org.

www.tumor-project.eu contact: sakkalis@ics.forth.gr

VIGOR++ (2011-2014)

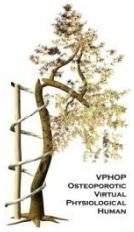
is researching and developing ICT tools for the analysis, modelling and simulation of human physiology and disease processes of the GI tract.

www.vigorpp.eu contact: e.j.harting@tudelft.nl

VPH2 Virtual Pathological Heart for the Virtual Physiological Human. (2008-2011)

Now completed - developed a patient-specific computational simulation of the human heart to assist clinics in defining the severity and extent of disease in patients with post-ischemic Left Ventricular Dysfunction (LVD).

www.vph2.eu/ contact: mcarenini@noemalife.com



VPHOP Osteoporotic Virtual Physiological Human (2008-2012)

Developing a patient-specific, multiscale modelling framework for predicting osteoporotic fracture in elderly patients.

www.vphop.eu contact: m.viceconti@sheffield.ac.uk

VPH-Share Virtual Physiological Human: Sharing for Healthcare – A Research Environment (2011-2015)

Developing an organizational framework for the widespread integration of VPH services to share data and knowledge more effectively .

www.vph-share.eu/ contact: joanne.watson@sheffield.ac.uk