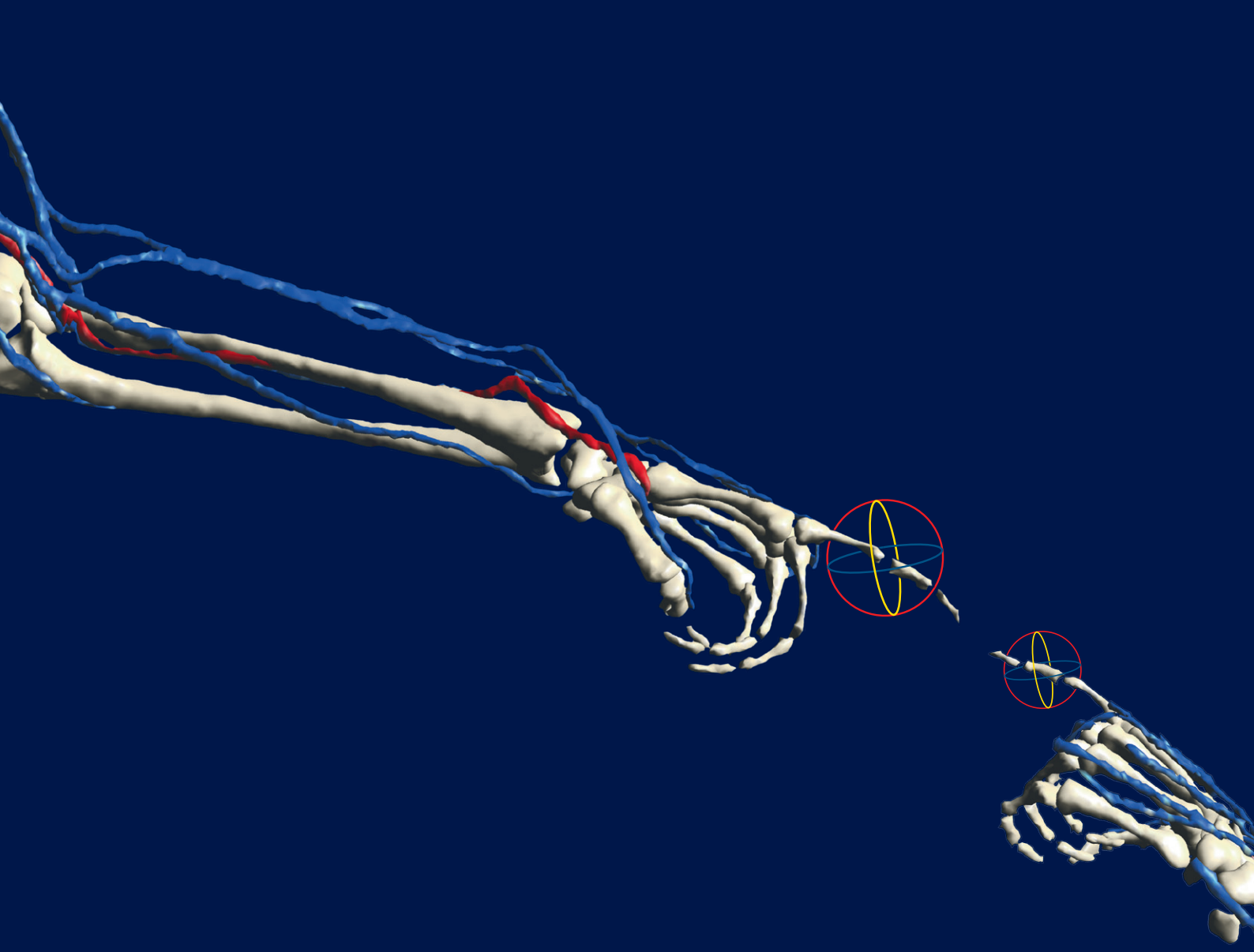

ITIS FOUNDATION 2008

IT'IS FOUNDATION

If I had just one word to describe IT'IS in 2008, it would be *momentum.* We continued to build our Foundation based on a fundament of sound science, integrity, innovation, and a culture that values the unique contributions of a diverse workforce. In the past year, we made significant advances on several levels essential to IT'IS' ongoing success and pacesetter role: progress in the clinical development of diagnostic, therapeutic and preventative tools for cancer; expansion of the Virtual Family; advances in MR safety of implanted devices; the continued development of our core competencies in experimental and computational electromagnetics; and a newly broadened focus on computational life sciences (CLS). The accomplishments highlighted in this report underscore our Foundation's ability to deliver on our commitments and visions, and they point to the potential for greater success in the future.

More specifically, 2008 was an important year of maturation for IT'IS during which our hyperthermia treatment planning tool demonstrated proof of concept and moved into Phase II clinical trials for head and neck cancers. We also welcomed several new members to our Virtual Family (Page 16). By extending our database of anatomically correct high-resolution models with four more children and an adult male with high body fat content (to be completed in Summer 2009) to better represent the variations of the general population, we were able to further pursue the development of a novel compliance testing procedure on MRI compatibility of active implantable medical devices and improve existing procedures for compliance testing of current and future medical devices (Page 13). Applying these new methods and solutions, however, requires fast, reliable and flexible software tools. Our new low frequency solver complements the FDTD solver by effectively evaluating and minimizing human exposure to any EM source, including gradient fields of MR scanners, induction heating, etc., as demanded by the EU directive (Page 12).

Based on this progress, we have continued to build upon our strong research initiative with the formation of a new research group focusing on CLS. The goal is to expand our electromagnetic and thermal solvers with novel flow and acoustic solvers and to improve the computational modeling of fundamental biological processes with the aim to develop in silico models of tumor growth and tumor treatment for new therapeutic approaches (Page 14).

In any organization the greatest ideas are only as effective as the people who implement them, dream them, who make it happen. Through all the challenges and successes in 2008, it is the character of our organization that allows us to persevere with passion and resolve. It is in this spirit that I thank our employees, students, colleagues and collaborators (Page 5) who live out our Mission Statement with dedication and relentless effort every day and our Board Members (Page 4) who help to steer us along the right path with their support and counsel.

Innovative ideas are allowed to flourish at IT'IS, where there are no barriers to creativity and excellence. We are grateful to our many donors and sponsors (Page 9), for helping us achieve such excellence. Their generosity helps stimulate the imagination of our group. We thank them for supporting our pursuit of discovery, in particular, the Swiss Federal Office of Public Health and the National Research Foundation for funding several specialized and beneficial research projects, and SPEAG and MMF for their long-term commitment and investment in the mission of IT'IS.

IT'IS' strategy for growth and innovation also depends on our ability to leverage what we can do inside our foundation with the capabilities of other organizations sharing common ground with us. We gratefully acknowledge and thank the following laboratories and colleagues who share infrastructure and co-advise PhD students/PostDocs, especially Prof. Wolfgang Fichtner, Prof. Klaas Prüssmann, Prof. Gábor Székely, Prof. Olaf Schenk and Prof. Toshio Nojima.

The evolution of our efforts is not complete. We look to the future with optimism about our initiatives, vision and goals that guide us in striving for increasing quality in all that we do. We draw confidence from our past achievements and innovative spirit, yet we are mindful that the world has become more complex, the pace of change quicker, many of the needs more urgent. We turn to 2009, our 10th anniversary year, with the belief that the work of the IT'IS Foundation has never been more challenging or more crucial. I am determined that in the coming years we will expand and improve our record of achievement, build beyond it and rise to all the demands the changing world will place on us.

Zurich, May 2009 *Prof. Niels Kuster*

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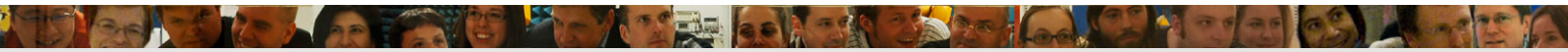

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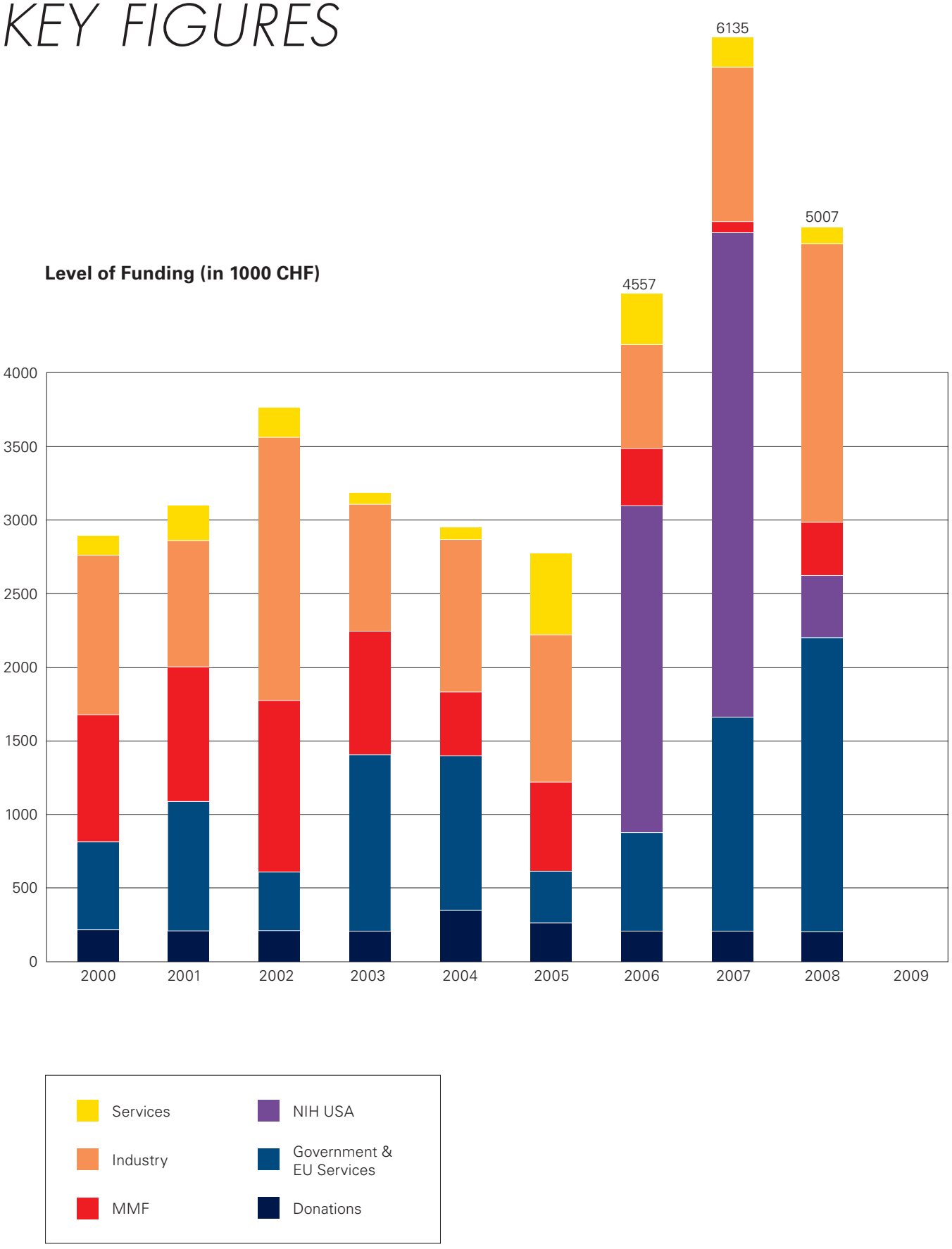
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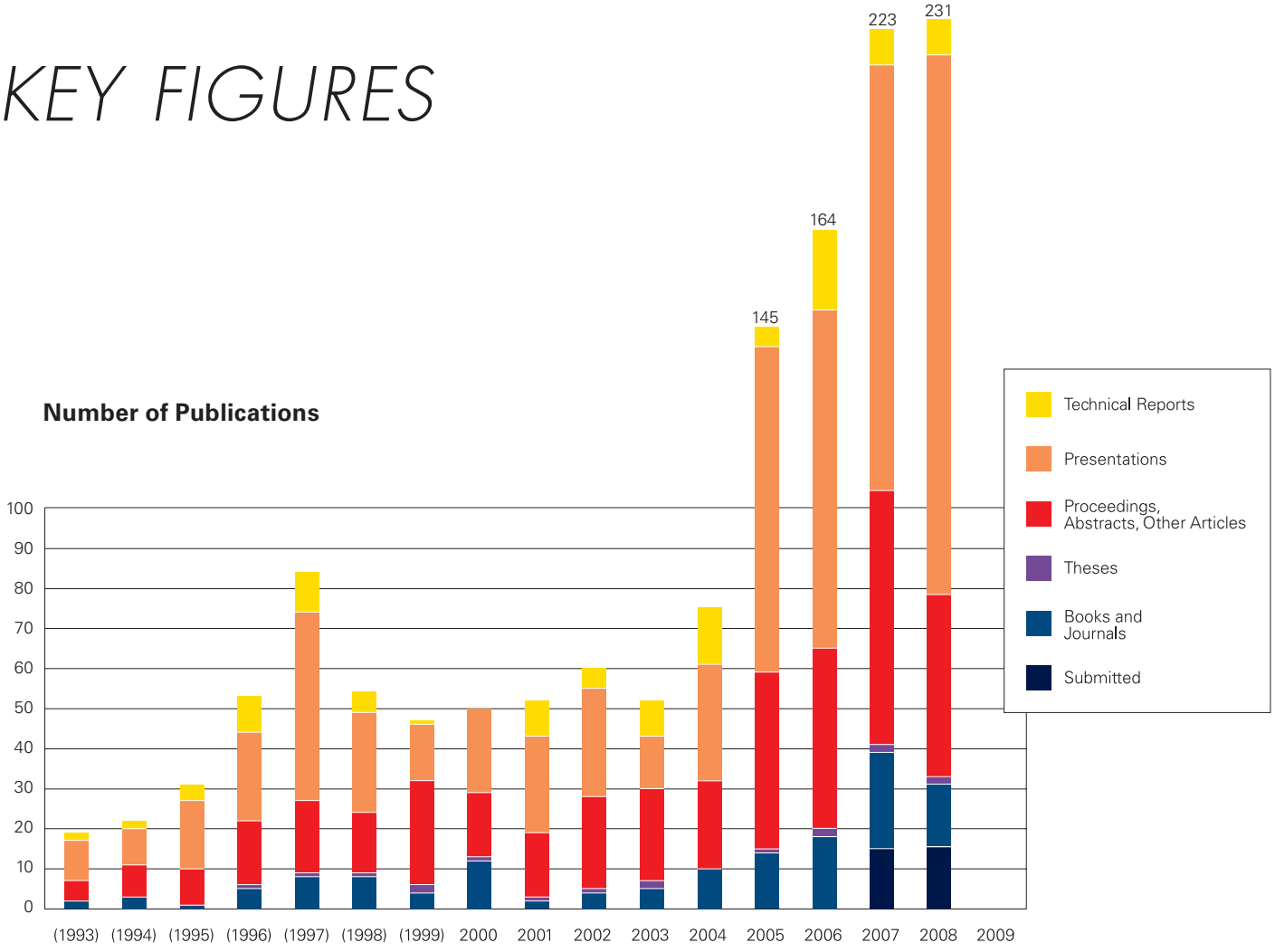

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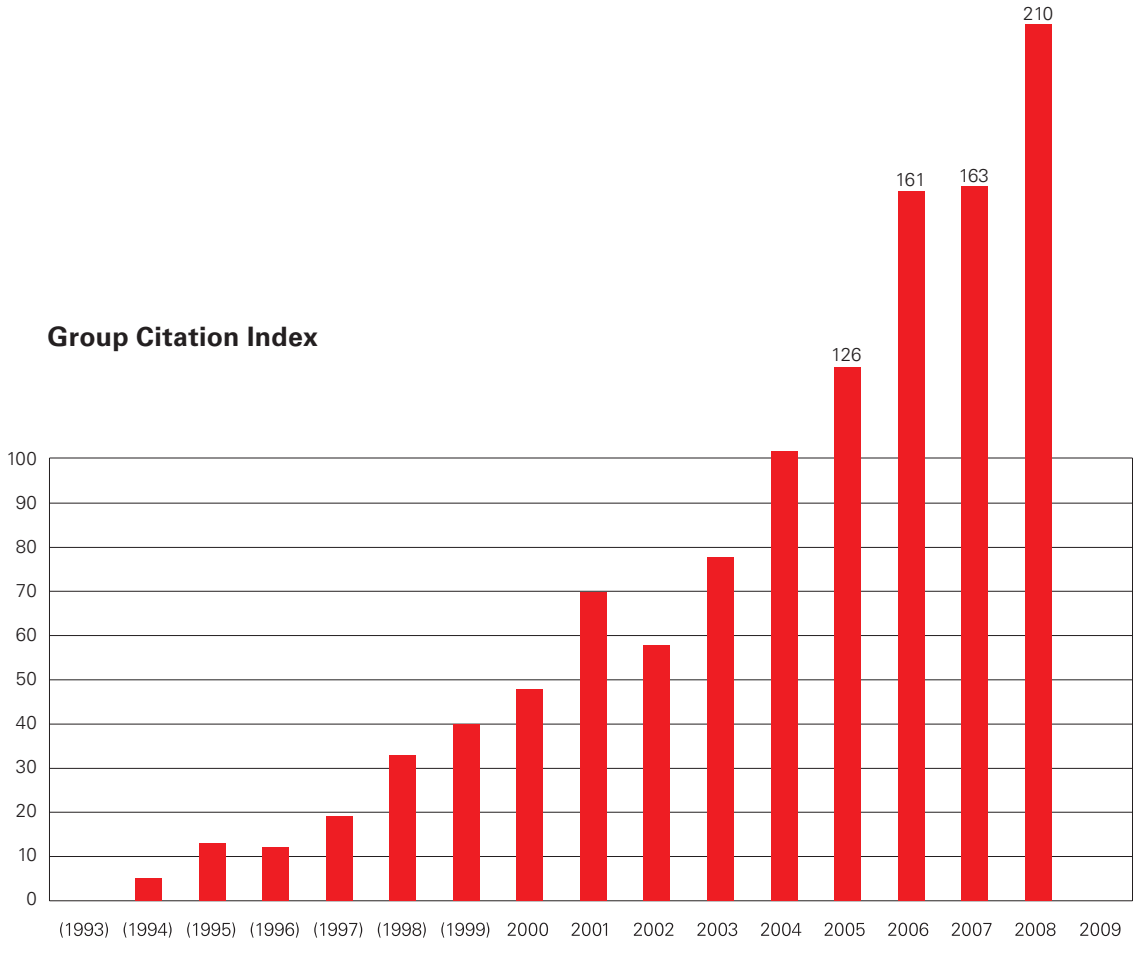

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PROJECTS

Measurement and Computational Techniques

TD SENSOR	development of a field sensor in the time and frequency domains
CSCIENCE HANDHELD	research on the scientific bases to test compliance of handheld and body-mounted transmitters
EXPA INDOOR – BAG	development of procedures for the assessment of human exposure to electromagnetic radiation from wireless devices in home and office environments
BASEXPO I & II	development of procedures for assessing human exposure to EMF from base stations
EX-T	research on the effects of torso exposure to wireless devices with respect to existing compliance testing standards
STANDARDIZATION	participation in regulatory activities (standards committees & governments)
EX-AGE	characterization of mobile system exposures considering age dependent anatomical and physiological changes
EX-BASE	characterization of exposures close to base station antennas
EX-KIDS	evaluation of the whole body exposure of children with respect to present EMF exposure standards
EX-Headsets	assessment of the human exposure to EMF when using mobile phones with wired or wireless hands-free kits
EX-Headsets	assessment of the human exposure to EMF when using mobile phones with wired or wireless hands-free kits
EX-Bulbs	assessment of the human exposure to EMF of Energy Saving Bulbs
MHD phase II	development of a magneto-hydrodynamic solver for anatomical models

Health Risk Assessment

EMF & BRAIN – SLEEP	effects of EMF on sleep, sleep EEG and brain function
REPLICATIONS	replication studies of bio-experiments
sXc	development of optimized exposure systems for in vitro studies from static to GHz
sXv – NTP / NIEHS	development, manufacturing, installation and detailed dosimetry of the reverberation chamber based exposure system for the in vivo studies by the NIEHS
sXh	development of an optimized exposure system for human provocation studies from static to GHz
VIRTUAL FAMILY	generation of anatomical CAD models of an adult male, an adult female and two children for dosimetric and medical applications
EXPA EPI – CTIA	exposure assessment for epidemiological studies of mobile phone users
BRAIN-X	assessment of the brain functional region specific exposure to EMF for near- and far-field sources
FETEX	assessment of the exposure of the fetus to electromagnetic fields from ELF to RF in uncontrolled environments
NRP Genotox	genotoxic effects of electromagnetic fields (RF and ELF) on cells
NRP Worms	effects of C. elegans worms exposure to electromagnetic fields
NRP Sleep	effects of RF electromagnetic radiation on human sleep EEG and cognitive tasks
ZonMw	assessment of the exposure of children to electromagnetic fields from ELF to RF in uncontrolled environments

Health Support Systems

HYCUNEHT	research and optimization of hyperthermia treatment quality
EX-MRI-OCC	evaluation of the occupational exposure to EMF of medical personnel working in the close environment of MRI scanners
COLHA	characterization and optimization of the RF link of hearing aids
MRI+	development of MRI exposure risk probability based on local temperature safety considerations
INHY	development and characterization of a magnetic field applicator for heating magnetic nanoparticles for cancer therapy
CLS	computational life sciences - development of a multiphysics, multiscale high-performance biomedical simulation framework

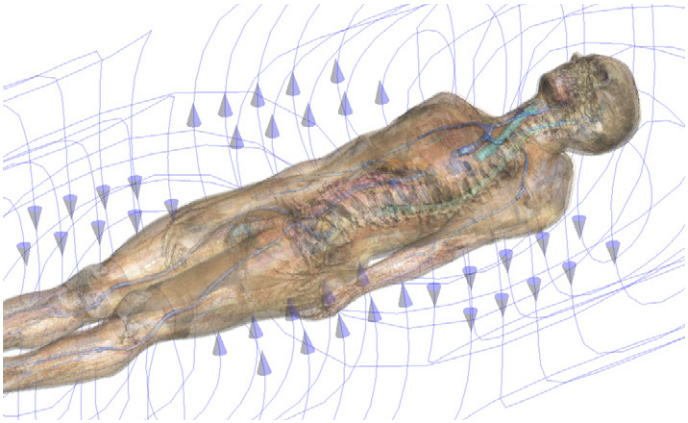
NOVEL LOW FREQUENCY SOLVERS

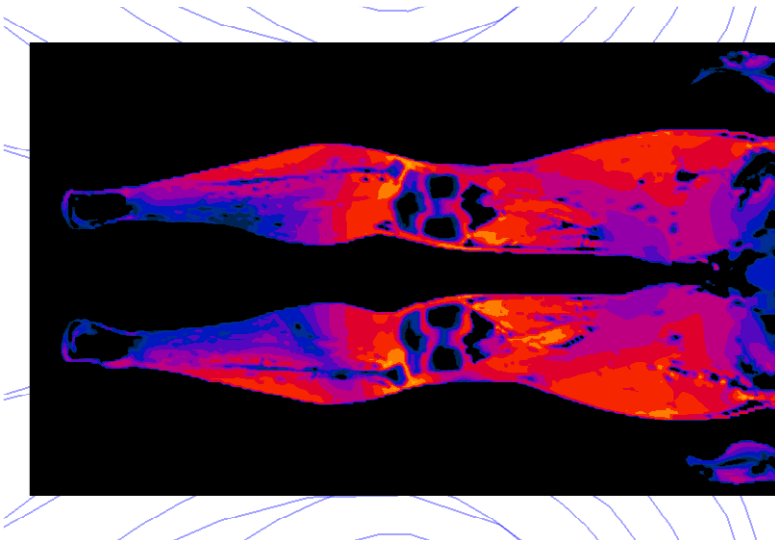
During the last decade, the IT'IS Foundation has continuously advanced its most effective FDTD based full-wave electromagnetic solver, resulting in industry's leading simulation package SEMCAD X. As interest in low frequency (30 kHz–300 kHz) applications (e.g., induction heating, wireless power supplies, intrabody communications, etc.) has grown in recent years, regulators have shifted their focus (e.g., the Directive of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to EMF), prompting the need for novel low frequency solvers.

While the finite-difference time-domain method (FDTD) has proven to be an efficient and powerful numerical tool, especially for the interactions of complex human body models and electromagnetic (EM) fields, the method becomes inefficient at low frequencies due to the explicit time integration scheme. The computational burden can be lowered considerably by using quasi-static approximations of Maxwell's equations. A CTI funded project allowed us to focus on the development of a versatile and robust electromagnetic simulation tool for low frequency or static problems.

The different quasi-static approximations have been tailored towards IT'IS' core competence "whenever tissue meets EM." The tissue material parameter range fulfills the low frequency regime in which the magnetic field is only negligibly perturbated by induced currents in the body. Therefore, a good approximation is to consider the external magnetic fields as the total magnetic field. Two main categories were defined, the electro (no magnetic fields, but known metal potentials) and magneto (external current distribution, i.e., fixed currents) quasi-static approximations (EQS and MQS). Both have been implemented using the finite element method (FEM) in the frequency domain. Linear nodal functions serve as a solution basis for the potential values. The Bio-Savart formula integration (static magnetic field) is performed along the straight segments of a polyline (current source) using a segment-wise analytical formula to attain the highest efficiency and the highest flexibility (MRI gradient coil system). The final linear system is solved using iterative system solvers (CG, BiCGStab), which are highly memory efficient, and therefore, superior to direct solvers. One major advantage of our solution is its compatibility with the same nonuniform but rectilinear computational grids of the FDTD methods, such that the same modeling and meshing engines can be used from DC to THz including our very detailed human body models.

The novel solvers have been extensively validated and applied to various real-world simulation applications, including occupational EM safety in an MR environment (MQS), investigations of transcranial magnetic stimulation (MQS), cancer treatments (thermal ablation, EQS) and compliance in the vicinity of power lines (EQS). In addition, these novel solvers have already been integrated into the commercial software package SEMCAD X of our project partner SPEAG and have proven to be very effective for many industrial applications.

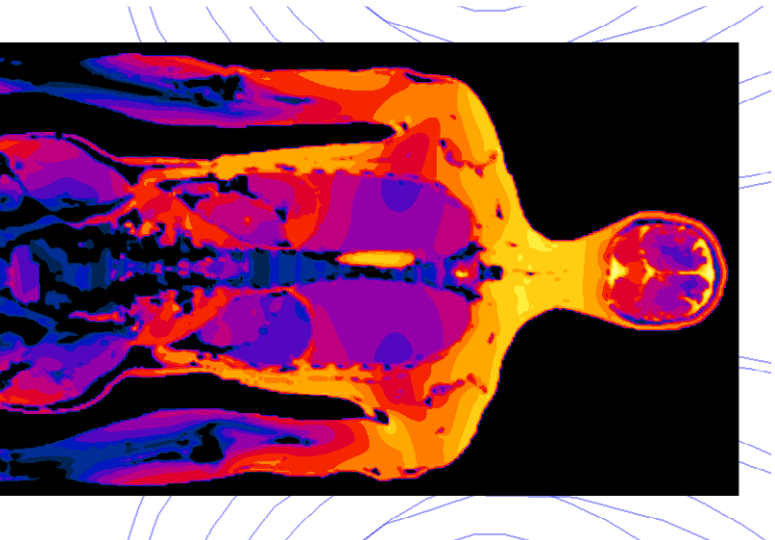




METHODS AND PROCEDURES FOR SAFETY ASSESSMENTS AND OPTIMIZATION OF MRI

As with any complex and evolving technology, the use of magnetic resonance imaging (MRI) for clinical and non-clinical use raises important issues concerning the protection of patients and personnel. Upon entering the MRI environment, the rules of safety are imperceptibly changed by the powerful magnetic fields and invisible radiofrequency (RF) waves. Safety in the MRI suite is both vitally important and unusually challenging to implement because of the invisibility of the threats. MRI is a noninvasive imaging technology that provides an unmatched view inside the human body. Although it is touted as a safe modality because magnetism is non-ionizing and does not carry the risks associated with examinations using conventional radiography or computed tomography (CT) scans, improved image quality and novel applications generally require higher EMF strengths and faster image acquisitions, both of which may result in an increase in the EMF exposure of patients and workers. In addition, the magnetic energy can present serious risks to persons with implants, causing device malfunctions and excessive heating.

Recently, the ICNIRP guidelines for electromagnetic exposures have been enforced in new European Union (EU) safety directives. It is feared that these enforcements might unnecessarily restrict current and future developments in the field of MRI technology. The FDA has also questioned current MR exposure estimations of the IEC standards. We endeavored to fill gaps in knowledge about actual exposure levels for patients and occupational personnel during routine MRI procedures, thus allowing industry to optimize the imaging modality in terms of patient safety, clinical benefits and health cost savings.



Occupational Assessments (Ex-MRI-Occ)
Since most MRI systems are operational 24/7, the magnetic fields, which can be as much as 60,000 times more powerful than the Earth's magnetic field, are always present. As mandated by the EU, we determined the exposure of MR workers, including radiologists, interventionalists, nurses, researchers, technicians and other personnel such as cleaners, under specific yet common scenarios. Our focus was to gain a comprehensive understanding of clinical MRI procedures, to identify possible worst-case scenarios and to develop appropriate measurement instrumentations. The results showed that the ICNIRP RF expsoure limits for workers can be met, even for interventional MRI applications, without compromising patient and procedural safety, effectiveness or benefits. However, the basic restrictions regarding induced currents by the gradient fields can be significantly exceeded and should be investigated further to determine the threshold value for hazardous effects with higher precision.

Patient Assessments (MRI+)
MRI scans are typically contraindicated for patients with ferromagnetic implants (e.g., pacemakers) because of the potential for injury from the magnetic field forces exerted on the implant, magnetic field interferences with the electromechanical operation of the active implant and RF induced heating. To increase the safety of patients with and without implants, we investigated and validated hazard threshold models as a function of the MRI equipment, scanning procedures and implants, and developed the appropriate instrumentations. Cooperation with an international consortium, including major MR manufacturers, FDA, and seven leading academic partners in this field, provided the vast knowledge necessary to undertake these evaluations.

This research will result in novel computational and experimental tools and procedures for routine evaluations and optimization of various MR related technologies. The tools will enable accurate exposure assessments and effective optimization of complex coil systems and scanning sequences. Most importantly, however, is the beneficial impact that these new solutions, methods and applications will have on patients, hospitals and MR and implant manufacturers.

IN SILICO TUMOR MODELING

In silico analysis/computational life sciences is the springboard for discovery in the quest to enhance our understanding of cancer at a cellular and systematic level and to improve the quality of treatment outcomes. Cancer is not a single disease with a single type of treatment. There are more than 200 different kinds of cancer, making it one of the most prevalent and deadliest diseases in the world. This mystifying array of cancers, each of which behaves differently, grows differently and responds to treatment differently, limits the effective applicability of specific therapeutic treatments. While it remains a tough challenge to develop effective diagnostic and therapeutic cancer treatments, the IT'IS Foundation continuously strives to expand its knowledge base. For example, 2008 was an important year of maturation for IT'IS during which our hyperthermia treatment planning tool demonstrated proof of concept and moved into Phase II clinical trials for head and neck cancers. By expanding our understanding of the fundamental biological, chemical and physical processes that occur during cancer development and treatment, we aim to provide suggestions for improving the quality of treatment which patients receive. True to our mission, we do this through a sustained program of research by engaging in new areas of scientific relevance.

By harnessing the power of our advances and expertise in electromagnetic energy delivery systems and EMF modeling, we endeavored to expand our research focus in 2008 and explore new scientific frontiers at the interface of computation, biology, physics and engineering. The newly established Computational Life Sciences (CLS) group at IT'IS integrates all of these disciplines to develop potential novel methodologies that combine computational and biological approaches to unlocking the molecular, cellular and physical mechanisms underlying cancer.

Biological level
Since each type of cancer has individual and specific characteristics influenced by the organ it has invaded, the modeling of the fundamental biological processes is essential. An in silico model of tumor growth and tumor treatment is being developed to help understand the processes involved and study the impact of individual factors. The models may eventually provide a fast means to formulate hypotheses by linking these functional relationships and applying them to new treatment approaches.

There are many levels at which tumor biology can be modeled, ranging from the molecular level to the gene expression level to the subcellular and cellular levels to the tissue level. Our research on tumor growth and treatment will mainly focus on a macroscopic level based on continuum approaches (except for the modeling of individual blood vessels). Variables such as density distributions of different cell types, signaling molecules, nutrients and chemotherapy drugs as well as pressure distributions and perfusion are considered.

Multiphysics approach
The behavior of each cellular component depends on a combination of physical/chemical phenomena. Studying such multiphysics phenomena involves simulating the complex coupling of the different physical, chemical and biological processes through algorithms. Since the coupling of these processes prevents the individual equations from being solved independently, highly complex computations must be performed to simultaneously solve the system.

Establishing and discovering the coupling relationships of the various phenomena defined within the data is a potential key to unlocking the underlying mechanisms. The novel models will help investigate how each cell reacts to mechanical effects (stress, pressure), chemical reactions, biological signaling and cell proliferation. They will also allow detailed investigations on the influence of individual parameters such as temperature or interstitial fluid pressure.

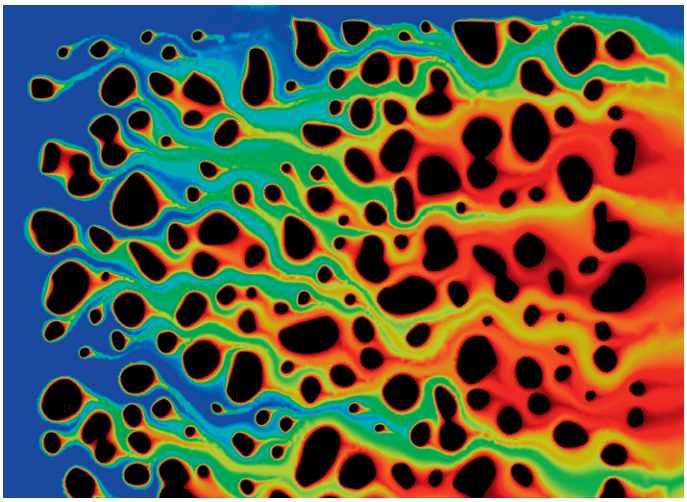
High Performance Computing
The massive computational power needed to simulate the complexity of each biological process in multiple temporal and spatial resolutions requires sophisticated and efficient use of state-of-the-art hardware. Several new projects were initiated in collaboration with our most

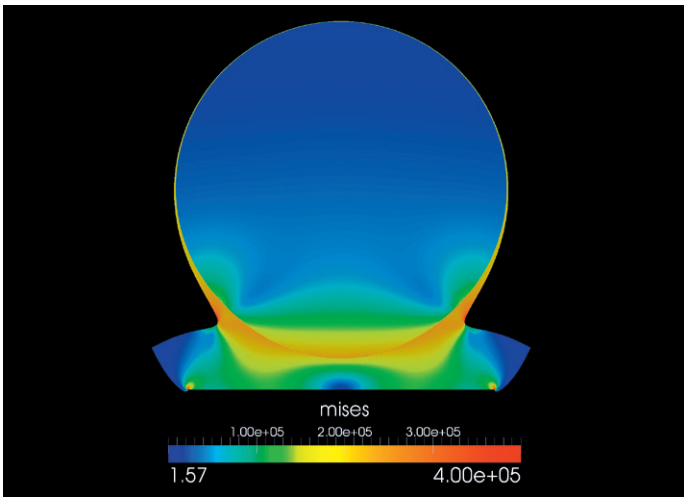
dedicated partners to develop enhanced parallelization of solver codes and hardware accelerated solutions (GPU and Cell Broadband Engine based).

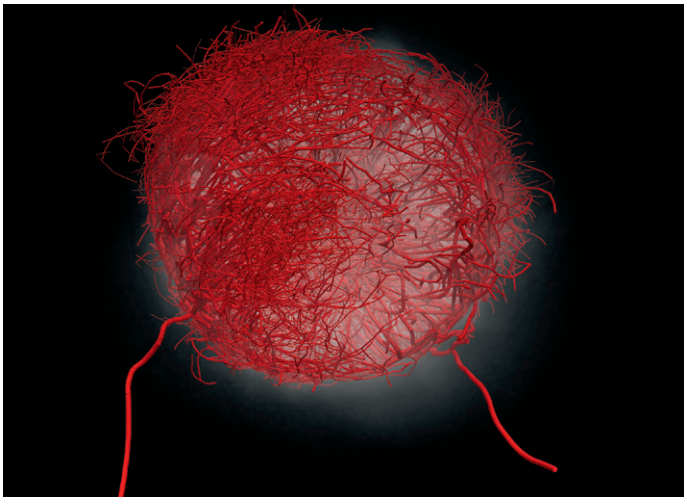
In Silico Model

In silico model development is built upon continuum and discrete models, which consider different cell types: healthy cells, proliferating tumor cells, nonproliferating tumor cells, necrotic tumor cells and endothelial cells. Computer simulations will allow detailed investigations into the impact of microenvironmental transport processes (e.g., of oxygen, nutrients, growth factors), cell proliferation, signaling pathways, cell communication and morphological changes in response to modulations of the local environment. The continuum description of tumor cell behavior will help reveal the functional links between each of these processes. For example, since a tumor does not have its own network of blood vessels initially, it must recruit endothelial cells to form new vessels. This process is triggered by a lack of oxygen and the subsequent expression of angiogenic growth factors. Nutrients are obtained from the environment's supply via diffusion or via the blood vessels. As the cells divide and proliferate, the pressure increases, causing tissue deformation and changes in cell proliferation and blood flow. If heat, chemical agents or chemotherapy drugs, such as doxorubicin, are introduced, each process is again modulated. These models might help to reveal the underlying physical and chemical processes occurring within tumors at various stages and states of development and the mechanisms of growth.

Collectively, these research initiatives represent our commitment to advancing our mission for improving the quality of life by finding and validating new targets for anticancer therapies and new methods for delivering therapy to tumors. By extending our computational capabilities to couple continuum and discrete models, a fundamental understanding of the complex biological systems and relevant phenomena associated with cancer growth and responses to therapeutic treatments might be provided.







POPULATING COMPUTATIONAL SPACE

Anatomy is the basis for understanding how the human body functions. The delivery of anatomical knowledge requires a new format to match the wide variety of medical diagnostic imaging and therapeutic procedures that have evolved and to accurately represent the vast complexity and individual variability of each structure for advancing electromagnetic exposure assessments without invasive probing and for testing and improving the design of medical implants. The rendering of the complex anatomy of the human body in computational space is quite challenging though. The Virtual Family, which evolved in 2007 as a joint development between the IT'IS Foundation and the US Food and Drug Administration, has become a vital fundament to these advances. The novel, high-resolution, anatomically correct, whole-body CAD models consisting of an average man, woman, and two children were constructed from MR imaging data of four volunteers and segmented to yield up to 84 different tissues and organs. The models were reconstructed as 3D CAD objects with high fidelity anatomical detailedness using our novel segmentation and 3D CAD reconstruction tools.

In 2008, we extended the Virtual Family to include four new children between 5 and 14 years of age and one adult male with a high body fat content (BMI > 35kg/m^2) for better representation of the variations that exist in the general population. Acquiring more child models is essential as children can only be representative of their own age due to their significant developmental changes (e.g., height, proportional changes and tissue composition changes). The dielectric properties of fat tissue differ substantially from those of most other body tissues, and the new adult male model will help to assess the impact of fat tissue on the electromagnetic field distribution in the immediate environment of an implanted device. A broad range of different anatomical characteristics is necessary to rigorously assess the variations and the worst-case conditions of the target quantity, such as specific absorption rates.

The Virtual Family evolved even further this past year and can now be manipulated to mimic the natural movements of a human body. As we extend the concept by integrating the structure of each model with expanded knowledge and by rendering each structure dynamically in real time and space, the models have become more active and reactive like a living person. Since all models originally stood in upright positions with their arms parallel to their trunks, it was not possible to account for changes induced by natural movements in the tissues surrounding organs and joints. In electromagnetics, the coupling of the incident electromagnetic fields is a strong function of whole-body and partial-body resonances. As a consequence, any movement, such as bending the body, alters the effective absorption cross section at higher frequencies. With the recently developed poser, the joints of the Virtual Family models can be articulated in all natural positions. The articulation is based on the movements of the bones in their joints: Moving a parent bone will automatically affect the positions of all members connected to it. A hierarchical definition of volumes of influence and of the distribution of a spatial weighting function then yields the target positions and shapes of all affected soft tissues (skin, muscles, blood vessels, etc.). The shape and position of all soft tissues are automatically recalculated using either a noniterative transformation in the dual quaternion space or a divergence-free vector transformation. The processing of the tissue transformation occurs in real time in the former method, while the latter method accurately preserves the volumes of the soft tissues.

The next step is to extend the surface representation of the tissues to a volumetric description and assign dielectric, thermal, mechanical and chemical parameters and properties to the tissues and organs of the models. Virtual patient applications are on the horizon.

SERVICES

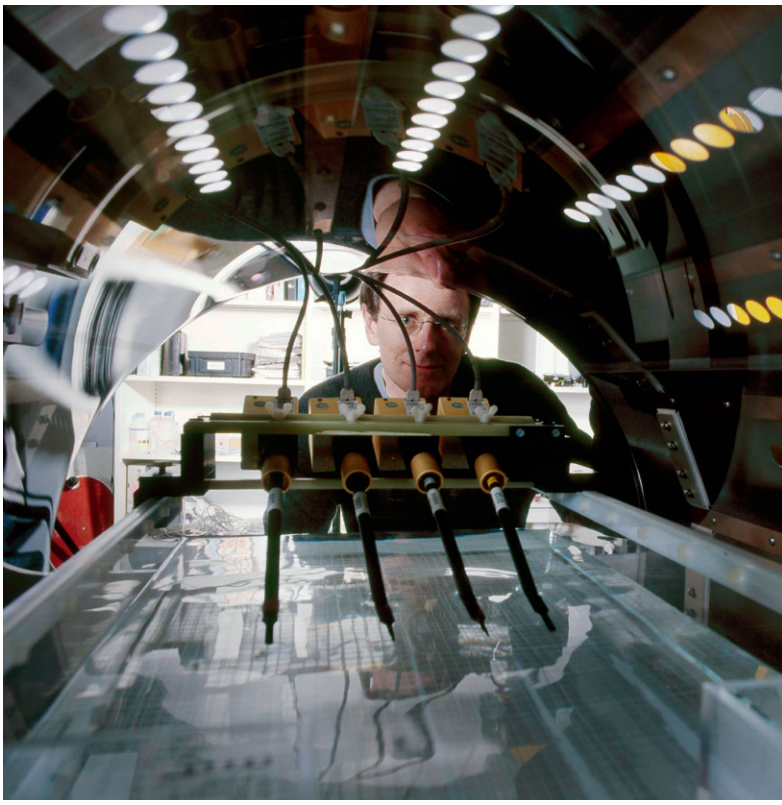
The IT'IS Foundation is an internationally renowned competence center for analysis in all areas of the electromagnetic near-fields from DC to the high GHz range. Although the primary activities of the foundation are dedicated to advanced research, it also offers R&D and evaluation services ranging from communication link system design to EM safety evaluations to EMC/EMI.

RF Safety and Compliance Testing
The IT'IS Foundation developed many of the procedures and instrumentations for the demonstration of wireless device compliance with respect to EM safety guidelines that are currently applied to national and international EMF product standards. Globally regarded as the preeminent, truly independent institute for dosimetric evaluations, the foundation continues to be at the forefront in developing the most accurate and suitable testing procedures, with particular emphasis on compliance testing within MR environments at present. It is equipped with the most advanced laboratories for compliance testing of devices/instruments ranging from inductive heaters to wireless devices to medical implants in MR environments (several DASY5 systems, iSAR, EASY4MRI, MITS1.5, etc.). We are always enhancing our capabilities to conduct state-of-the-art EMI/EMC evaluations.

Communication Link System Design
Consultations regarding standards and homologation rules include the revision of technical requirements, the assessment of regulation procedures and the evaluation of impending standards. We offer full development and design services for custom-specific antennas with optimized link budgets when operated in complex environments, e.g., on-body or inside the body. Only the latest development and design tools are used in our labs, including DASY5NEO and SEMCAD X.

Safety White Papers
As a leading player in the global effort on health risk assessment research and as an active participant in commissions developing EMF and MRI safety guidelines as well as numerical and experimental product compliance standards for the aforementioned guidelines, the IT'IS Foundation provides a full range of safety white papers. Numerous international organizations, industries and governments have entrusted the foundation to draft safety white papers for existing and future technologies as well as for the implementation devices.

EMF Workshops
The IT'IS Foundation organizes customized workshops on EMF-related issues of current interest in collaboration with our national and international partners. On-site and specialized workshops and seminars can also be arranged upon request.



INFRASTRUCTURE

Dosimetric, Near-Field and EMC/EMI Facilities

Semi-Anechoic Chamber
This shielded, rectangular chamber has the dimensions 7 x 5 x 2.9 m (L x W x H). It is equipped with a reflecting ground plane floor, and half of its walls are covered with electromagnetic absorbers. The chamber contains an integrated DASY5NEO system and can be utilized for all research activities involving dosimetric, near-field and far-field evaluations, the optimization and synthesis of handheld devices, body-mounted transmitters, implants, desktop applications, micro-base and pico-base station antennas, exposure setups, calibration procedures, EMI tests, MRI safety tests, compliance testing of implants, etc.

Two Reverberation Chambers
The Blue and NIEHS Reverberation Chambers have the dimensions 4 x 3 x 2.9 m and 3.7 x 2.2 x 2.7 m (L x W x H), respectively. Both chambers are equipped with two mechanical stirrers and provide controlled and consistent environments for EM emissions and immunity testing, as well as shielding effectiveness and susceptibility testing of electromagnetic equipment.

Facility for Dosimetric Compliance Testing
IT'IS shares a facility with Schmid & Partner Engineering AG which meets the requirements for dosimetric evaluations. Class C accreditation is expected in 2009 through METAS for all types of dosimetric evaluations.

Technical Equipment and Instrumentation

Spectrum and Network Analyzers
1 Rohde & Schwarz FSP, Spectrum Analyzer 9 kHz – 30 GHz
1 HP 8753E, Network Analyzer 30 kHz – 6 GHz
1 HP APC 85033B, Calibration Kit

Signal Generators and Testers
1 Agilent E8251A, Signal Generator, 250 KHz – 20 GHz
1 Rohde & Schwarz SMU200A, Signal Generator
1 Rohde & Schwarz SMT06, Signal Generator
1 Rohde & Schwarz SMIQ02B, Signal Generator
1 Rohde & Schwarz SML03, Signal Generator
2 Rohde & Schwarz SML02, Signal Generators
1 Rohde & Schwarz SMY02, Signal Generator
1 HP 8647A, Signal Generator 250 KHz – 1000 MHz
1 Agilent 33250A, Waveform Generator
3 Agilent 33120A, Waveform Generators
1 Rohde & Schwarz CTS55, Digital Radio Tester
1 Rohde & Schwarz CMU200
2 Anritsu 3700A

DASY, iSAR, EASY4MRI, MITS
3 SPEAG DASY5NEO
1 SPEAG DASY5SAR
1 SPEAG DASY4
1 SPEAG iSAR Flat
1 SPEAG iSAR Head
1 MITS1.5 w/Phantoms
1 MITS 3.0 w/ Phantoms
1 INDY (3 year child head) Phantom
1 ISABELLA (6 year child head) Phantom
1 SPEAG SAM V6.0 Phantom
2 SPEAG ELI4 Phantoms
3 SPEAG ASTM Phantom
1 SPEAG HAC Extension
2 SPEAG EASY4/MRI
4 SPEAG DAEasy4MRI, Data Acquisition Electronics
2 SPEAG DAE4, Data Acquisition Electronics
1 SPEAG TSIL, Temperature Probe
8 SPEAG T1V3LA, Temperature Probes
2 SPEAG H3DV6, H-Field Probes
2 SPEAG H3DV7, H-Field Probes
1 SPEAG EX3DV3, Dosimetric Probe
2 SPEAG EE3DV1, E-Field Probes
2 SPEAG ER3DV6, E-Field Probes
1 SPEAG EF3DV6, E-Field Probe
3 SPEAG ET3DV6, Dosimetric Probes
1 SPEAG ET1DV1, Dosimetric Probe
2 SPEAG ET1DV2, Dosimetric Probes
Tissue Simulating Liquids 27 MHz – 6 GHz

Meters
1 Rohde & Schwarz NRP, 2 NRP Z-91 Power Meter
2 Agilent E4419B, 4 HP 8482A, Power Meters
3 HP 436A, 3 HP 8481A, Power Meters
3 Agilent 34970A, Data Acquisition Units
1 Magnet Physik FH49 – 7030, Gauss/Teslameter

Amplifiers
1 LS Elektronik 2450, Amplifier, 400 W / 900 MHz
3 LS Elektronik 2449, Amplifiers, 200 W / 900 MHz
2 LS Elektronik 2448, Amplifiers, 60 W / 900 MHz
3 LS Elektronik 2452, Amplifiers, 200 W / 1800 MHz
1 LS Elektronik 2451, Amplifier, 60 W / 1800 MHz
1 LS Elektronik 2447, Amplifier, 5 W / 1800 MHz
2 LS Elektronik 2780, Amplifiers, 40 W / 2140 MHz
1 Amplifier Research 10S1G4A, Amplifier 800 MHz – 4.2 GHz
1 Kalmus 717FC, RF Power Controller 200 – 1000 MHz
1 Nucletudes ALP336, Amplifier 1.5 – 2.5 GHz
1 EG&G Princeton Applied Research Lock-In Amplifier
8 Mini-Circuits, Amplifiers, ZHL42, 700 – 4200 MHz

Other Equipment
1 Narda H2304/101 Exposure Level Tester 1 Hz – 400 KHz
8 Maury 1878B, 3-Step Tuners
1 Siemens, Universale Messleitung (0.5) 1 – 13 GHz
6 Validation Dipoles D835, D900, D1640, D1800, D2450, D5GHz
2 SPEAG Dipoles SCC34 Benchmark
10 Various Antennas
1 Tektronik 2235, Oscilloscope
1 Heraeus BB6620, Incubator
1 Opus 10 Thermo-Hygrometer
1 PTM 3000 Thermometer

Computers
23 MacOS X: 2 PowerMac G5, 1 iMac G4, 11 MacBook Pro, 4 MacBook, 2 PowerBook G4, 3 MacBook Air
39 12 Dalco AMD Dual Opteron 2.61 GHz, 1 Dalco Dual-Core AMD Opteron 2.21 GHz, 1 Dell Dimension 8400 P4 3.4 GHz, 4 Dell Dimension 8300 P4 2.6-3 GHz, 3 Dell Dimension 8250 P4 1-3.4 GHz, 5 Dell Dimension 8200 P4 1-3 GHz, 1 Dell Dimension 5000 P4 3.2 GHz, 2 Dell OptiPlex GX110, 1 Compaq EVO, 1 HP vl420MT P4 1.5 GHz, 1 Pathworks Laptop, 2 IBM T61 2.5GHz, 1 IBM T60 2.16GHz, 1 IBM T43p 1.86 GHz, 1 IBM T42p PM 1.7 GHz, 1IBM T40 1.5GHz, 1 Dell Latitude D800 1.6 GHz
7 LINUX: 6 AMD Dual Opteron aXware ClusterInABox (3 Dual-boot Windows XP 64 Professional), 1 Silverstone MiniCIB AMD Athlon 64 X2 Dual 2.41 GHz (Dual-boot Windows XP 64 Professional)

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IT'IS FOUNDATION

History
The IT'IS Foundation was established in 1999 through the initiative and support of the Swiss Federal Institute of Technology in Zurich (ETH), the global wireless communications industry and several government agencies. IT'IS stands for Information Technologies in Society.

Legal status
IT'IS is a non-profit tax-exempt research foundation.

Vision
The Foundation for Research on Information Technologies in Society is dedicated to expanding the scientific basis of the safe and beneficial application of electromagnetic energy in health and information technologies.

IT'IS is committed to improving and advancing the quality of life of people with disabilities through innovative research and application of emerging technologies.

IT'IS Foundation is an independent research institute.

IT'IS Foundation endeavors to provide a proactive, creative and innovative research environment for the cultivation of sound science/research and education.

Funding
Private and industry sponsorship, public and industry research projects and information services.

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