

**ESF Research Networking Programmes – 2009 Call for Proposals –  
Final list of all Proposals recommended for funding to MOs and planned launch in 2011**

	Project No.	Leading Unit	Affiliation	Project
1.	09-RNP-008	SCSS	SCH SCSS	<p><b>European Historical Population Samples Network (EHPS-Net)</b> Kees Mandemakers (NL) <i>Keywords:</i> History; Demography; Large Historical Databases; Life Course Data; Census data <u>Abstract:</u> The European Historical Population Samples Network (EHPS-Net) brings together scholars to create a common format for databases containing information on persons, families and households. This format or Intermediate Data Structure (IDS) forms an integrated and joint interface between many European databases.  During the project period, the main databases will convert their material to the IDS format. In the meantime, data extraction programs for different types of studies (e.g. on migration and fertility) are prepared in close collaboration between researchers and programmers. The intended system is open, scalable, and extendable. New types of analysis can be introduced by adding new extraction modules. Anyone can contribute an extraction module, which will be peer-reviewed and published in an e-journal. Programming will be organized in research projects delivering demonstrators.  Our activities include stimulating the creation of new databases and organizing training sessions in participating countries where historical population database are still scarce.  The network creates a portal that provides access to the European databases, as well as to important non-European ones which have joined the network. On the portal site an overview will be given of all databases, their contents and the degree to which their variables have been structured into the IDS. The portal will also centralize and systematize the data extraction software. The site will present and make downloadable the standardization rules, metadata and documentation. Thus, the existing expertise is made available to the research community.  We assemble scholars who by creating regional or national databases have advanced the field of (historical) demography in their respective countries. The network allows them to proceed beyond the boundaries of their individual datasets, by creating a common interface for the history of the life course. In this way, we can understand the historical dimensions of the challenges faced by contemporary European (and global) populations.</p>
2.	09-RNP-023	EMRC	EMRC	<p><b>ESF Network for Orofacial Clefts Research, Prevention and Treatment: (EUROcleftNet)</b> Peter A. Mossey (UK) <i>Keywords:</i> Cleft lip; palate; aetiology; congenital anomalies; epigenetics; sub-phenotypes <u>Abstract:</u> Orofacial clefts (OFC) occur in 1.7 per 1,000 live births with more than 10,000 infants born with clefts in Europe each year and with marked variation both in birth prevalence and standards of care. All individuals require multi-disciplinary care from birth until adulthood and have higher morbidity and mortality throughout life than unaffected persons, and there is a burden to their families and to society. This Network aims to deal with the 2 major themes, treatment (quality of care) and prevention (via genetics and environmental factors), in conjunction with the recently formed European Cleft Organisation (ECO) who have begun to address the health inequalities with particular focus on Eastern Europe.</p>

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				<p>This ESF EUROleftNet Network proposal will build on previous success of collaborative research in the field of non-syndromic OFC (NS-OFC). The recent GWAS “phase” of research in the field has spawned a comprehensive list of putative genetic loci, and the new grand challenges are (a) to fine map the cleft loci and identify the functional gene variants that are at the base of the genetic risk for NS-OFC (b) embark on epigenetic and functional genomics projects (c) undertake gene-environment interaction studies, (d) unravel the epistatic interactions that are part of the aetiology of NS-OFCs and (e) translate genetic findings into clinical practice and prevention strategies.</p> <p>The aim is to develop biomarkers to measure nutritional and lifestyle interventions in prevention, produce a panel of gene loci that could be screened for risk assessment in the clinical setting and ultimately progress to recommendations for prevention. Expertise in statistical approaches, the availability of high throughput genome wide techniques, the triad DNA biobank already collected through Eurocran, robust data on phenotyping, combined with the diversity of the European populations give the EUROleftNet scientists a leading start in this project.</p>
3.	09-RNP-026	SCSS	SCSS	<p><b>European Network on: “Rights to a Green Future”, Uncertainty, Intergenerational Human Rights and Pathways to Realization (ENRI-FUTURE)</b></p> <p>Marcus Düwell (NL)</p> <p><i>Keywords:</i> Human Rights, Environmental Ethics, Intergenerational Justice, Precautionary Principle, Risks and Uncertainty</p> <p><u>Abstract:</u> Climate change, limited energy resources and population growth raise questions about moral and political obligations towards future generations. For several reasons, the current discussions in ethics, political philosophy, law, risk assessment and economy are insufficiently addressing these normative dimensions. First, the uncertainty of the future forms a severe obstacle for a moral assessment of political options while an ethics of risk and precaution is still missing. Second, the plea for a sustainable politics has its foundation in obligations we have with regard to future generations. These obligations, however, easily conflict with the established human rights-framework (see e.g. the conflict between the aims ‘sustainability’ and ‘poverty eradication’). Third, all political strategies towards a sustainable politics have normative and contested implications. Without clarification of these normative dimensions the discourses about sustainability become rather meaningless. Collaborative research to identify the interrelationships between all dimensions and the development of a research agenda for a future-centred ethics of the environment is urgently needed.</p> <p>The proposed network aims to identify and analyze the questions that need to be addressed in order to determine what responsibilities we have to future generations and what the political consequences of carrying these out are. This requires (a) knowledge of future climate developments and methods to predict them, (b) critical assessment of moral and legal frameworks, especially that of human rights, in an intergenerational perspective, (c) a concept of moral and political responsibility suitable to apply to the openness of the future, and (d) an investigation of the main psychological and institutional obstacles for a sustainable politics. This challenge asks for an approach that utilizes and synthesizes the methodologies and knowledge of the relevant disciplines must be employed. Therefore this network is an interdisciplinary enquiry that aims to develop a research agenda to address the ethics of sustainability.</p>

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4.	09-RNP-048	LESC	LESC	<p><b>Quantitative Models of Cellular and Developmental Biology (QuantumCell)</b></p> <p>Hernan Lopez-Schier (ES)</p> <p><i>Keywords:</i> Quantitative live imaging; cell signaling; tissue patterning; tissue mechanics; biophysics</p> <p><u>Abstract:</u>            The development and function of a multicellular organism depend as much on the signalling and patterning programs encoded in its genome as in the physical forces acting upon and exerted by its constituent cells. Because genes produce the individual players of cellular functions, genetic analyses are very successful in discovering the pathways that control the development of plants and animals. However, the ultimate players in the formation of tissues are the cells. Mechanical forces created and exerted by cells can stabilize tissues for reliable tissue development and performance, while they can also modify their structures allowing organs to respond to demand or recover from damage. Signaling gradients and genetic oscillations involved in patterning show remarkable precision in specifying cell states, while at the same time responding rapidly to changes in tissue morphogenesis. This combination of robustness and flexibility is a challenge for the cells and the genome, and both a driving force and a constraint for the evolution of organisms. However, it is still poorly understood how the genome and the mechanical cellular environment interact, and how the global morphogenetic processes controlled by them influence each other.</p> <p>QuantumCell represents a multi-disciplinary project whose main objective is to bring together experts from complementary disciplines with a firm interest in a quantitative understanding of the basic mechanisms that govern morphogenetic processes at subcellular to tissue levels. It has become evident that imaginative and refined experimental strategies based on genetics, imaging, quantitative and biophysical approaches, combined with the exploration of the fullest potential of mathematical modeling are necessary to understand cellular and developmental biology. We aim to form an interactive and collaborative network to bridge the gap between traditional developmental cell biology, biophysics and systems biology. We believe that the constitution of the QuantumCell network is a necessary first step towards this goal.</p>
5.	09-RNP-049	EMRC	EMRC SCSS	<p><b>Researching complex Interventions for nursing (REFLECTION)</b></p> <p>David Richards (UK)</p> <p><i>Keywords:</i> Complex interventions; nursing; research methods; evidence-based practice; post-graduate education</p> <p><u>Abstract:</u>            Nursing is a quintessential 'complex intervention'. It has a critical role to play in meeting health and social care challenges – an aging population, chronic diseases and new endemics at the fore of European health concerns. Increasingly, nurses engage in a wide range of highly complex activities, many of which take place in multiple care environments including acute medicine, chronic care facilities, community and residential homes. Changes in health care organisation internationally (e.g. short hospital periods, growing responsibility for patient self-care) place more health care in the hands of nurses, increasing the scope, the overall need for nursing care and for that care to rest on a solid evidence base.</p>

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				REFLECTION will bring leading European researchers in nursing together with other multidisciplinary experts in research methods within an overarching complex interventions research framework. Through summer schools and seminar programmes we will disseminate cutting-edge methods of critical importance for developing the scientific evidence base for nursing practice, to current nursing researchers, the new generation of early stage European researchers and to countries where the translation of research knowledge is still being developed. REFLECTION will focus on three activities: 1) Develop an interdisciplinary European Faculty network of researchers in nursing, equipped to design, plan and implement programmatic, mixed methods and complex interventions research in nursing; 2) share knowledge and expertise by running summer schools for early stage researchers in Europe using a complex interventions research methods curriculum; 3) develop programmes of translational research in nursing which are multi-state, multi-disciplinary, and directed at improving the evidence base of nursing to meet European health and social care concerns. We envisage that the REFLECTION network will lead to a step change in the quality and focus of research in nursing throughout Europe to the benefit of European citizens and their health and social care needs.
6.	09-RNP-053	EMRC	EMRC	<p><b>Translational Research on Antimicrobial resistance and Community-acquired infections in Europe (TRACE)</b></p> <p>Samuel Coenen (BE)</p> <p><i>Keywords:</i> Antimicrobial resistance; infectious diseases; translational research</p> <p><u>Abstract:</u> Uncertainties in infectious disease management have resulted in prescriptive promiscuity, which largely explains the escalating antibiotic resistance of common bacterial respiratory pathogens in the community. Technologies and solutions are available to address these issues, and the individual areas of expertise do exist in Europe, but the problem is in integrating these.</p> <p>Currently several research programmes related to the proposed Research Networking Programme are being funded (both) at a national and a European level to address the key questions in this field, e.g. ESAC (European Surveillance of Antimicrobial Consumption; www.esac.ua.ac.be; DG Sanco 2001-2007, ECDC 2007-2010) and GRACE (Genomics to combat Resistance against Antibiotics in Community-acquired LRTI in Europe; www.grace-lrti.org; FP6 2006-2011 and FWO 2008-2011). These projects, coordinated by the applicants, already have resulted in successful spin-offs. It would be a devastating loss of expertise if after EU funding these two original and interdisciplinary consortia would no longer be able to share knowledge and expertise, develop new techniques, and train young scientists. ESAC will be taken over by ECDC as of 2011, but the sustainability of GRACE has not yet been ascertained.</p> <p>GRACE is a unique and successful Network of Excellence encompassing 19 Primary Care Networks in 15 EU countries, human and microbial genomics, collaboration with the major infectious disease and primary care societies, SME's, integrated by means of state-of-the-art ICT. The GRACE concept would serve as a model for the proposed Programme aiming to complement the ongoing activities substantially. In addition, it would facilitate the development of new translational research applications and advance the knowledge transfer and sustain the expertise in this field. A successful outcome of the proposed Programme would provide compelling evidence for the wisdom of further investment in Networks of Excellence in Europe.</p>

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7.	09-RNP-061	PESC	PESC	<p><b>Advanced Concepts in ab-initio Simulations of Materials (Psi-k)</b></p> <p>Peter H. Dederichs (DE)</p> <p><i>Keywords:</i> ab-initio calculations; density-functional theory; materials sciences; biology</p> <p><u>Abstract:</u> The project concerns the rapidly developing field of ab-initio calculations, which allow parameter free calculations of real materials at the atomic level, applicable to all condensed matter systems. Such simulations are now an indispensable part of materials science, a methodology in which Europe is now the leader worldwide. The progress over the last 20 years is largely due to the success of density-functional theory (DFT). But materials science has now developed to a point where ground-state and excitation energies and other properties must be predicted with even higher accuracy for larger and ever more complex systems, beyond the limit of present methodology. Therefore the present project aims at new concepts and ideas to bring the field forward, with more accurate, powerful and efficient methods. One part is devoted to obtain more accurate total energies and excitation energies, requiring an improved description of electronic correlations and including methods based e.g. on improved functionals, quantum chemistry methods for solids and Quantum Monte Carlo. The second, equally important part is connected with the description of larger systems and more complex materials and processes, including e.g. N-scaling and multi-scale methods. The third part considers methodology challenges arising for specific materials, like e.g. structure optimisation methods for alloys, or Keldysh formalism for transport on nanoscale.</p> <p>The proposal is a concerted effort from among members of the European Psi-k community for electronic structure calculations and represents a smaller, but very important part of the broader activities of Psi-k. The project includes a series of method-oriented workshops, some conferences including a methodology-conference and a large final dissemination conference, exchange visits and a training program with graduate schools, hands-on tutorials and summer schools. The main aim is to go beyond present state-of-the-art density functional methods and to maintain and enhance the European lead in the ab-initio field.</p>
8.	09-RNP-062	SCH	SCH	<p><b>Network for Digital Methods in the Arts and Humanities (NeDiMAH)</b></p> <p>Lorna Hughes (UK)</p> <p><i>Keywords:</i> ICT research methods; DARIAH; digital memory organizations ; communities of practice; digital humanities</p> <p><u>Abstract:</u> The NeDiMAH Network will examine the practice of, and evidence for, advanced ICT methods in the arts and humanities across Europe, and articulate these findings in a series of outputs and publications. To accomplish this, NeDiMAH will provide a locus of networking and interdisciplinary exchange of expertise among the trans-European community of digital arts and humanities researchers, as well as those engaged with creating and curating scholarly and cultural heritage digital collections.</p> <p>NeDiMAH will work closely with the EC funded DARIAH and CLARIN e-research infrastructure projects, as well as other national and international initiatives. The Network will bring together practitioners in a series of thematic Working Groups, which will examine the use of formal computationally-based methods for the capture, investigation,</p>

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				<p>analysis, study, modelling, presentation, dissemination, publication and evaluation of arts and humanities materials for research. This research will contribute the classification and expression of ICT methods used the arts and humanities in three key outputs: a map visualising the ICT</p> <p>methodological commons; an enhanced ICT Methods Ontology; and a collaborative forum for the European community of practitioners active in this area. These outputs will serve to formalize and codify the expression of work in the digital arts and humanities, give greater academic credibility to this work, and enable peer-reviewed scholarship in this area. NediMAH will maximise the value of national and international e-research infrastructure initiatives by developing a methodological layer that allows arts and humanities researchers to develop, refine and share research methods that allow them to create and make best use digital methods and collections. Better contextualization of ICT Methods will also build human capacity, and be of particular benefit for early stage researchers.</p>
9.	09-RNP-064	PESC	PESC	<p><b>Applied and Computational Algebraic Topology (ACAT)</b> Martin Raussen (DK) <i>Keywords:</i> Persistent Homology; Shape Analysis; Topological Robotics; Statistical Topology; Directed Topology &amp; Concurrency</p> <p><u>Abstract:</u> The revolutionary growth of experimental data in the sciences and the availability of unprecedented computing power pose many challenges to contemporary mathematics. The ESF Research Network on "Applied and Computational Algebraic Topology" will combine efforts of researchers from thirteen European countries to develop mathematical tools for the following broad research themes:</p> <ul style="list-style-type: none"> <li>(a) The topological and statistical analysis of shapes, images, and large multi-dimensional data sets;</li> <li>(b) Algorithms for motion planning and the study of configuration spaces of mechanical systems;</li> <li>(c) Statistical topology and the study of large growing systems;</li> <li>(d) The theory of concurrent computation and computer networks.</li> </ul> <p>Research on these themes is currently carried out in small groups spread over several European countries. The Network will facilitate intensified interactions and cross-fertilization, which we predict will lead to new results and entire new research directions as well as to commercial applications in industry. The Network will organize summer schools and conferences to support the formation of an integrated research community</p> <p>in "Applied and Computational Algebraic Topology" and to attract an increasing number of students to the field. The Network will actively collaborate with experts outside Europe.</p>

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10.	09-RNP-078	LESC	LESC	<p><b>Predicting Biodiversity Spatial Dynamics in a Changing World: the Evolutionary Ecology of Dispersal in Complex Systems (PREDISP)</b></p> <p>Jean Clobert (FR)</p> <p><i>Keywords:</i> biodiversity; dispersal; spatial ecology; global change; invasion</p> <p><u>Abstract:</u>            The effective management of biodiversity during a period of rapid environmental change requires a proper understanding of populations' spatial dynamics. Dispersal is at the core of these processes and, for example, has been identified as a key life-history trait in determining which species are likely to track changes in climate by rapidly shifting their biogeographic ranges. Dispersal results from a multitude of genetically determined and context dependent movement decisions of organisms and, as such, is highly variable and adaptable. Our ability to forecast and manage the response of biodiversity to a broad suite of environmental drivers is dependent on our capacity to apply this recently acknowledged complexity in modelling individual movements. To do so, a more integrated eco-evolutionary research agenda needs to be developed, with inputs from multiple fields such as sensory physiology, evolutionary ecology, population ecology, genetics and mathematics. This is why we aim to develop a broad network allowing the exchange of ideas and researchers between established groups of scientists in those fields. We will integrate theoreticians (mathematical and simulation modellers) and empiricists working with recognized microbial, plant and animal model systems and using a variety of approaches (genetics, genomics, physiology, behaviour) in the laboratory and the field.</p> <p>The main goal of this network is the development of a strategic approach to the mechanics of spatial ecology and – very importantly – the design and implementation of coordinated, interdisciplinary research projects to address key questions with respect to dispersal ecology, evolution and its feedbacks to higher level population and community dynamical and spatial processes. PREDISP will lead to a model-based biological understanding of how best to predict the spatial dynamics of biodiversity in a changing world. We will use the powerful theoryàdataà refined model approach of systems biology and secure the added value of simultaneously tackling multiple empirical-model/digital-model systems.</p>
11.	09-RNP-085	PESC	PESC	<p><b>Evaluating Information Access Systems (ELIAS)</b></p> <p>Maarten De Rijke (NL)</p> <p><i>Keywords:</i> Evaluation methodology; Living laboratories; Information access; Interactive information retrieval; Information seeking</p> <p><u>Abstract:</u>            Although the speed of computers and volume of information has grown exponentially since the first search engines were created in the 1950s, nearly 6 decades on, the methods used to test state of the art information access systems have changed little. However, there is growing scientific evidence of a need for a complete testing overhaul: producing novel evaluation methods that take a user-oriented perspective on assessing the effectiveness of information access systems.</p> <p>The proposed network will establish a research and training programme for the evaluation of information access</p>

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				<p>systems which will define a new measurement paradigm based on so-called living laboratories. This paradigm involves (i) exploitation of novel market places and forums where large numbers of users are recruited into early stage evaluation experiments to test a particular aspect of an information access system; and (ii) using operational systems as experimental platforms on which to conduct user-based experiments at scale. The network will achieve an evaluation methodology directed at user-oriented interactive evaluation, a new and tested set of interactive evaluation metrics, infrastructure and test suites based on these and an ongoing collaborative forum with evaluation cycles with a focus on evaluating information access systems, as well as producing a European network of new researchers trained in the improved methodologies.</p>
12.	09-RNP-087	LESC	LESC	<p><b>Measuring and Modelling of Volcano Eruption Dynamics (MeMoVolc)</b></p> <p>Timothy H. Druitt (FR)</p> <p><i>Keywords:</i> volcano eruption dynamics; eruption regime change; eruption measurements; volcano remote sensing; volcano modelling</p> <p><u>Abstract:</u>            The dynamics of erupting volcanoes are highly complex, with nonlinear feedbacks and multiple eruptive states during single eruptions. Without better quantitative understanding of these processes, interpretations of geophysical and geochemical signals recorded at the surface will remain largely empirical. This programme will probe the dynamics of volcanic reservoirs, conduits and plumes, focusing on the processes that trigger changes from one eruptive state to another. It will tackle the problems synergistically at the intersections between traditional disciplines, and will involve 41 top-level scientists from 20 research institutes and volcano observatories in 9 countries. Measurements of quantitative eruption parameters will be made at several target volcanoes using multiple ground-based and satellite-based remote sensing techniques, the instrument arrays of the volcano observatories, and analysis of eruption products using techniques of textural and chemical microanalysis. Laboratory experiments using real and analogue materials will be used to explore magma properties and extract phenomenological laws governing eruption dynamics. Robust eruption models will be developed using (i) benchmark laboratory experiments to validate the component physics, and (ii) multi-parameter datasets to seek first-order consistency between models and measurements, thereby building confidence in our quantitative understanding of the natural system. Short visits and exchange grants will enable sharing of measurement/modelling capabilities between participating institutions and will facilitate analysis of multi-parameter datasets and numerical simulations. Emerging technologies and concepts will be communicated to young scientists at open-call workshops, brainstorming meetings and training summer schools. Training courses will be published first online for free access, then as a textbook.</p>

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13.	09-RNP-089	SCH	SCH	<p><b>The European Network on Word Structure. Cross-disciplinary approaches to understanding word structure in the languages of Europe (NetWordS)</b></p> <p>Vito Pirrelli (IT)</p> <p><i>Keywords:</i> Word Structure; Memory Models; Word Processing &amp; Learning, Cognition; Language Cognitive Neuroscience</p> <p><u>Abstract:</u> Morphologically complex words are common to all European languages. They represent a fundamental part of what we mean by human language knowledge and the basic building blocks of language productivity. Nonetheless, words remain a challenging realm of scientific inquiry, at the interface between lexicon and grammar, requiring integration of a number of orthogonal disciplines and approaches, ranging from psycho- and neuro-linguistics, to theoretical, variationist and historical linguistics, to memory processes and computational models of (sub)symbolic processing.</p> <p>Scientists all over Europe are currently pursuing important lines of work on word structure, mostly supported by nationally-funded projects or bi-lateral cooperation programmes. There nonetheless seems to be a growing need for a larger-scale integrated European effort, focusing on common medium-term objectives, to promote interdisciplinary cross-fertilization and synergy, and optimize research investments in terms of more convergent and complementary efforts. The European research scenario is particularly conducive to these goals, due to the robustly empirical character of its methodological stance and the unique range of relevant scientific domains where European scientists appear to have, at present, a huge potential for major breakthroughs.</p> <p>By bringing together experts of various scientific domains and different theoretical inclinations, this Network proposal intends to advance our current awareness of the theoretical, typological, psycholinguistic, computational and neurophysiological evidence on the structure and processing of words, with a view to promoting novel methods of research and assessment for grammar architecture and language physiology. This will be achieved through knowledge networking and dissemination and scientific meetings organized over a four year period. Moreover, the Network will have a highly interdisciplinary profile, will promote training and development of young scientists through short visits and exchange grants, and will encourage the integration of new partners. The Network will also have a clear global dimension with collaborations with the Mental Lexicon Research Group in Canada.</p>
14.	09-RNP-090	PESC	PESC	<p><b>High-flux semiconductor sensors for X-ray medical imaging (HIFSEN)</b></p> <p>Jan Franc (CZ)</p> <p><i>Keywords:</i> sensor; X-ray imaging; high flux;polarization</p> <p><u>Abstract:</u> The objective is to create a scientific community able to develop the materials and sensors needed for health and industrial applications. These objectives will be reached by combining the efforts of the most advanced laboratories in Europe working in the specific areas concerned. The scientific research objective will be a complete development and evaluation of large size High Flux Room Temperature Semiconductor Sensors (HIFSEN) based on II-VI compounds to be used in medical applications, using the experience, the existing electronic, the knowledge and the research infrastructure available among the participants in this ESF Research Network.</p>

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				<p>Practically all imaging applications require high photon fluxes that form in the sensor material such concentrations of electrons and holes, that quasi Fermi energy of deep levels are changed. The space charge is then accumulated at deep levels due to trapped carriers, the internal electric field is deformed resulting in a decrease of charge collection efficiency (polarization). The nature of polarization at high photon fluxes required for medical imaging is completely different than at low fluxes, because the concentrations of photo-generated electrons and holes are comparable or higher than the concentrations of deep levels and polarization occurs at times comparable to operation times of sensors. The charges caused by band bending and by trapping of photo-carriers at deep levels are at high fluxes comparable. This fact opens a possibility of optimization of internal electric field and reduction of the polarization by engineering of contacts used for cathode and anode adjusting the space charge formed due to band bending at the electrodes. Two main mutually combined concepts of elimination of polarization in sensors operating at high fluxes of X-ray photons will thus be developed within the proposed ESF research network - engineering of the Metal/Semiconductor interface and decrease of concentration of trapping centers by material development.</p>
15.	09-RNP-092	PESC	PESC	<p><b>Holographic methods for strongly coupled systems (HoloGrav)</b>            Nicholas Evans (UK)  <i>Keywords:</i> Gauge theory; Strongly interacting systems; QCD; Condensed matter physics; String theory  <u>Abstract:</u>            The gauge/gravity duality conjecture asserts an equivalence between theories of gravity on a curved space and ordinary quantum field theories defined on the boundary of such spaces. This duality has become a powerful tool to study strongly interacting systems by use of a conjectured dual weakly coupled string/gravitational theory, allowing new computations that go beyond the standard perturbative techniques of quantum field theories. European theoretical physicists are at the international frontier of the exploration of gauge/gravity duality and its applications to physical systems. Members of this collaboration are leaders in the formal developments that attempt to prove and widen the conjecture, using string theory techniques and the integrability of certain gauge theories. Collaboration members also include world experts in the exploitation of this new computational tool to the strong nuclear force, hadronic physics, heavy ion collisions and condensed matter systems including high temperature superconductivity.</p> <p>This Holograv Network will orient research efforts to further the interdisciplinary aspects of the gauge/gravity duality, both in its formal aspects and in its applications to particle physics and condensed matter physics. Through the organization of workshops and schools, and through the incentive to run a common visitors programme, this network is an invaluable opportunity to promote the transfer of knowledge among participating organizations and to train graduate students who seek for a PhD in areas where strongly interacting systems are of central importance.</p>

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16.	09-RNP-101	LESC	LESC	<p><b>Thunderstorm Effects on the Atmosphere-Ionosphere System (TEA-IS)</b></p> <p>Torsten Neubert (DK)</p> <p><i>Keywords:</i> thunderstorms; electric discharges; plasma physics; gravity waves; global change</p> <p><u>Abstract:</u>  Two surprising phenomena have been observed above thunderstorms in the last twenty years; these are huge electric discharges in the stratosphere and mesosphere, and energetic bursts of gamma-radiation observed from satellites. Their late discovery demonstrates that our understanding of thunderstorms and of processes in the atmosphere above them is limited. They further underscore the point that thunderstorms affect not only the troposphere but all atmospheric layers and near-Earth space, and that several research fields must combine to advance our knowledge of the effects of thunderstorms on the atmosphere-ionosphere system.</p> <p>Two European space missions are planned for studies of thunderstorms and atmospheric coupling. They are the Atmosphere-Space Interactions Monitor (ASIM) of the European Space Agency (ESA) and the French satellite “Tool for the Analysis of RADIations from lightNings and Sprites” (TARANIS) developed by the French space agency Centre National d’Etudes Spatiales (CNES). To be launched in 2013 and 2014, the missions will study electric discharges above thunderstorms, thunderstorm-generated atmospheric gravity waves, and thunderstorm cloud properties.</p> <p>Preparatory activities include deployment of new ground instrumentation for observing thunderstorms, planning of balloon-campaigns to study the atmosphere above thunderstorms, laboratory experiments, and development of theory and models. These activities will provide an essential context for the satellite measurements. This networking programme will help to coordinate the activities, and to structure and expand the European research community behind the missions towards the common goal of studying fundamental thunderstorm processes and their impacts. This task requires a multi-disciplinary approach of geosciences and physics, and of observations, experiments and theory. The applications are as diverse as the science, ranging from the industrial use of electric discharges to improved understanding of the role of thunderstorms in a changing climate. The programme will stimulate the exchange of methods and results between the European and international communities involved.</p>
17.	09-RNP-102	LESC	LESC	<p><b>Conservation Genomics: Amalgamation of Conservation Genetics and Ecological and Evolutionary Genomics (EcoGenOmics)</b></p> <p>Joop Ouborg (NL)</p> <p><i>Keywords:</i> genomics of adaptation; metagenomics; epigenetics; inbreeding depression; phenotypic plasticity</p> <p><u>Abstract:</u>  Conservation genomics is a new field that is developing out of the merging of conservation genetics with ecological and evolutionary genomics. By using the latest genomic technologies conservation genomics is concentrating on : i) applying genome-wide markers to reliable estimate demographic and genetic parameters in a conservation context, ii) applying gene-expression tools to study the mechanisms behind important conservation genetic processes, like inbreeding depression, and iii) using metagenomic approaches to develop from population level approaches to species and community level assessments.</p>

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				<p>The field has been designated by the former ESF-CONGEN networking programme as “the future of conservation genetics”. At the same time, it was acknowledged that several challenges will have to be met, including: i) the transfer of genomic tools to non-model, threatened species, ii) the transfer of knowledge from genomic oriented labs to conservation oriented labs, iii) the equal sharing of genomic resources and knowledge between European labs, and iv) the design of multidisciplinary approaches to data management and analyses of the vast amounts of genomic data on threatened species likely to become available in the near future. The custodial responsibility to conserve biodiversity, including genetic variation within populations and species requires a pan-European approach.</p> <p>The CONGENOMICS programme aims to deliver a European platform for exchange of knowledge and facilities in the context of conservation genomics. By organizing workshops, summer schools, collaborative expert meetings and establishing a website and an exchange program at pan-European level, CONGENOMICS wants to be instrumental in the further development of the field of conservation genomics, and wants to aid less knowledgeable and affluent countries and research groups to be fully part of the new and exciting developments in this field. By adding a global dimension the programme also aims at exchanging knowledge between Europe and the USA in this respect.</p>
18.	09-RNP-109	LESC	LESC	<p><b>Cold-Water Carbonate Mounds in Shallow and Deep Time – The European Research Network (COCARDE-ERN)</b></p> <p>Silvia Spezzaferri (CH)</p> <p><i>Keywords:</i> carbonate mounds; Phanerozoic; ocean and continental drilling</p> <p><u>Abstract:</u> The proposed Research Network Programme aims to establish and strengthen the European component of the international initiative “COCARDE: An Industry-Academia Partnership for the Study of Cold-Water Carbonate Reservoir Systems in Deep Environments”. The rationale of COCARDE-ERN is to bundle multidisciplinary and cross-cultural scientific efforts to explore and drill carbonate mounds through space and time. COCARDE-ERN is riding the wave of major achievements in recent carbonate mound research during the last few decades fueled by remarkable discoveries in the early nineties. The generalized observation of recent cold-water carbonate mound systems and associated cold-water coral ecosystems at basin scale, has added a new dimension to the concept of carbonate factories, serving as a complementary counterpart to warm-water carbonate build-ups.</p> <p>A unique opportunity is shaped in these years to provide an integrated insight in carbonate mound systems on the European and North African margins, as an onset of a global venture, through a teaming up of the academic mound research community and the hydrocarbon industry. The exciting research subject of mounds as a fundamental strategy of Life throughout the history of the Earth meets the Industry interest for unconventional carbonate reservoirs. Approaching these mound systems from recent and fossil perspectives will shed a new light on carbonate mound research in a changing world.</p> <p>Exploring new research strategies based on the innovative and holistic 4D way of thinking will drive carbonate mound science beyond its present limits. Combining academic and industrial efforts, confronting warm-water and cold-water carbonate factories especially at the turn between icehouse and greenhouse worlds and exploring the variety of mound systems in space and time, will create a profound knowledge platform upon which young researchers can build-up their career by training and acquiring multi-disciplinary skills in earth sciences.</p>

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19.	09-RNP-124	PESC	PESC	<p><b>Precision Polymer Materials (P2M)</b></p> <p>Sébastien Lecommandoux (FR)</p> <p><i>Keywords:</i> polymer synthesis; biomimetic; self-assembly; functional materials; smart polymers</p> <p><u>Abstract:</u>            The aim of the proposed Programme is to combine the complementary expertise of leading European research groups in the design of precision polymeric materials, i.e. polymers with precisely defined molecular weight, architecture and functionality that are designed to self-assemble into functional materials via strategies that are inspired by or mimic biological self-assembly processes. The main aim of the proposed Programme is to promote interactions and facilitate exchange of, primarily, early career researchers with different backgrounds, ranging from catalysis, polymer chemistry and physics to theory, biochemistry and pharmacy.</p> <p>The recent developments in polymer synthesis methods allow the design of sophisticated (co)polymers. In the mean time, the ability to control and direct self-assembly has considerably improved. Another recent domain consists in the design of multifunctional systems, mainly for drug-delivery applications, able to load a large amount of therapeutic molecule, to release its content in a spatial and temporal controlled manner, and with the capability to serve as a contrast agent. As a result, one of the main challenges of today is to move from the current use of polymer materials in a “passive” way to an “active” one, where the polymer itself will have a functional role.</p> <p>The central part of the proposed research project concerns the design of multifunctional polymer nano-edifices. By learning from the principles used in Nature to achieve responsive, dynamic, active materials, it is possible to utilize synthetic or biological polymer systems to design active biomaterials. Such a biomimetic approach can have considerable impact, not only for biomedical applications, but also in the design of functional nanomaterials.</p> <p>The groups involved have great experience in the synthesis, characterization and modeling of complex and functional polymer systems, allowing a synergy for the elaboration and optimization of novel bio-inspired and functional materials with fine-tuned properties and for their future industrial application.</p>
20.	09-RNP-131	PESC	PESC	<p><b>The three-dimensional quark-gluon structure of the nucleon (3-D-nucleon)</b></p> <p>Mauro Anselmino (IT)</p> <p><i>Keywords:</i> nucleon structure; quarks and gluons; orbital motion; spin; spatial structure</p> <p><u>Abstract:</u>            The theoretical study and the experimental exploration of the internal structure of protons and neutrons (nucleons) have recently entered a new phase. Over the past 40 years an understanding of nucleons in terms of elementary constituents (partons, i.e. quarks and gluons) has gradually and successfully emerged. Much has been learned about the nucleon in terms of its “one-dimensional” parton structure, relevant when partons are assumed to move co-linearly with their parent nucleon, and encoded in the so-called parton distribution functions (PDFs). In the last few years theoretical breakthroughs have extended this simple picture, leading to new concepts, like the “Generalized Parton Distributions” (GPDs) and the “Transverse Momentum Dependent parton distributions” (TMDs). These concepts help to address long-standing questions concerning the motion of quarks and gluons inside the nucleon, their orbital motion, their spin and their spatial distribution. Dedicated experiments, either running or proposed, and</p>

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				<p>a related intense theoretical activity have made, and keep making, enormous progress towards a true 3-dimensional unraveling of the nucleon structure.</p> <p>The main goal of this proposal is to support and foster collaboration among the many theoretical and experimental groups working in the field. It is a well established scientific community, in constant growth, both in Europe and outside, active in Universities and in major experimental facilities. Special attention will be given to the organization of regular schools and workshops, bringing together senior experts and young researchers. The issue of the 3-dimensional nucleon structure is a central focus and driving force in the planning, and building, of future particle accelerators in Europe, USA and Japan.</p>