

**AComIn's Mission:** to strengthen the research and innovation capacity of the Institute of Information and Communication Technologies – BAS (IICT-BAS) by employment of incoming experienced scientists, by increasing the knowledge and skills of the IICT researchers in emerging areas as well as by purchasing modern research infrastructure. AComIn should help the institute to successfully accomplish its strategic mission: by 2016, i.e. 5 years after its creation, IICT-BAS has to become a leading RTD Centre in Eastern Europe, providing facilities and working conditions comparable to the average standards of the EU Centres of Excellence in ICT. The institute will support the sustainable regional and national growth and employment by providing RTD results to advanced industrial organizations; it will be a focal point of high-quality research and will provide excellent conditions for scientific training.

## AComIn Work Packages

### WP1: Strengthening the IICT Human Potential

Organizing the recruitment of incoming experienced researchers, both foreigners and Bulgarians, via long-term and short-term employment: 7 three-year post-doc positions and 34 person months dedicated to employing top scientists on short term contracts (incoming experienced researchers with more than 10 years of scientific experience). Integrating the activities of the incoming experienced researchers on long-term contracts into the every-day work of IICT-BAS.

### WP2: Purchasing Smart Lab and Building User Communities

Organizing the procedure for purchasing the Smart Lab devices via public tenders. Full integration of Smart Lab in the IICT-BAS computational environment, ensuring its future use by publishing User Manuals and Guides of Exploitation. In order to effectively exploit the modern technologies provided by Smart Lab devices, User Communities will be organized, consisting of industrial experts (company representatives) who aim at applying AComIn results in industrial settings. The User Communities will consist of representatives of the innovation-absorbing Bulgarian companies and trade associations of branch industries that need a deeper expertise and scientific innovation in order to increase their competitiveness. At least four User Communities are planned to be created in the following areas: a) 3D technologies; b) Speech processing; c) Microstructure dynamics and d) Advanced transportation systems.

### WP3: Networking with Leading EU Partners

Organization of two-way secondments and short visits between IICT-BAS and its partnering teams. Enabling the participation of IICT-BAS scientists at prestigious international conferences, international fairs/exhibitions, as well as information, partner-search and training events etc. organized in the EU. The work package is directed to experienced IICT-BAS researchers.

### WP4: Development of Intellectual Property (IP) and Knowledge Transfer (KT) Plan and Innovation Capacity Building

Setting up IP policies and KT processes at IICT-BAS and harmonizing them with the European standards for transferring research results to industry.

Raising sufficient awareness among IICT-BAS's staff of the value of protecting its IP and of measures for early identification of IP Potential. Intensive training courses in IP management will be organized for IICT researchers.

### WP5: Dissemination

Organization of various activities for broad dissemination of AComIn results at the regional, national and international levels. Organization of regular cycles of Technology Transfer seminars, aimed at User Communities and promoting the potential of the advanced ICT applications and the Smart Lab devices. Three patent applications are expected to be submitted to the European Patent Office, based on novel AComIn results. Applications will be delivered to the Bulgarian Patent Office too. Books and monographs are planned to be published; 3 movies about AComIn will be produced for national and regional TVs; a tour in the country will be organized, in order to inform a wider audience about the potential of advanced ICT. The following events will be organized:

- 16 international scientific conferences and workshops in scientific areas such as: advanced computing, language and semantic technologies, signal and image processing, optimization and intelligent control,
- 2 Information Days and 3 Doors Open Days in conjunction with Stock Exchange on Technology Transfer oriented towards User Communities and innovation-absorbing Bulgarian companies,
- 5 cycles of User Communities seminars, carried out by top incoming researchers participating in the AComIn team.

### Wp6: Assessment of IICT-BAS by Independent International Reviewers

Assigning a 'quality label' to the research performance, human potential, infrastructure, administrative and management capacity of IICT-BAS.

Promotion of IICT-BAS as an excellent regional unit with the capacity to perform high-quality RTD activities in the context of large EU research projects, infrastructures and clusters with ICT components. Four independent reviewers will assess IICT-BAS's overall research quality and capacity after AComIn WP1-WP5 completion.

### WP7: Management

Planning, managing, coordinating, monitoring and controlling the AComIn activities by focusing on success criteria, risk minimization and quality assurance. Ensuring the management of tender procedures for purchasing the Smart Lab devices as well as managing the various dissemination activities.



# AComIn Progress Report

## Employed Incoming Post-Docs

**Dr. Irina Temelkova** came to IICT-BAS from the University of Wolverhampton, UK, where she obtained her PhD degree in 2012. Her research interests lie in the field of Computational linguistics, and more precisely in applications of Computational linguistics to solving real-life problems. As Irina said, she had been attracted to and very happy for being selected for a postdoctoral position at the Bulgarian Academy of Sciences for three reasons: in the first place because she highly respects this institution, its research practices and history; because there was a very good match between the research direction proposed by Prof. Galia Angelova in the call for applications and Irina's research interests (extracting multilingual terminology from public websites), and finally because this allowed her to come back and work in Bulgaria and live with her family after years of separation. Irina went on by saying that she had been expecting, and has received very good treatment from the research group she is working for, and that she enjoyed the institution's highly intellectual environment. The aim of her research here is to complete a feasibility study for the applicability of online resources for collecting multilingual terminology and currently she is working on expanding patents search with terms from Wikipedia.



**Dr. Jean Michel Sellier** came to IICT-BAS from Purdue University, USA. He obtained his PhD degree in Mathematics (simulation of semiconductor devices) from the University of Catania, Italy. Jean Michel gained experience during his postdoc research on Plasma Simulations at Imperial College London, UK, and on Semi-classical Hydrodynamic Electron Transport models at INRIA, France. On the question "Why is he here?" Jean Michel answered: "Well, at some point of my life, I wanted to get back to Europe at the following two conditions: first, to have a salary, and second, to do something interesting in my life. I found the two conditions to be fulfilled here at the Academy." In IICT Jean Michel works with Prof. Ivan Dimov and currently develops a Wigner Monte Carlo simulator for next generation nanodevices.



**Dr. Stanislav Stoykov** came to IICT-BAS from the University of Porto, Portugal, where he obtained his PhD degree in 2012. His research interests are in the area of nonlinear dynamics of structures, i.e. bifurcation theory, stability and chaos, but also in modeling of structures by finite element method and parallel solvers for solving the resulting large-scale systems. As he said, after completion of his PhD, he wanted to come back to Bulgaria, and continue his research in the same direction. The project AComIn gave him this opportunity and part of his current work is like a continuation of his PhD, but he is also studying and using new numerical techniques for solving large-scale systems. In IICT-BAS Stanislav works with Prof. Svetozar Margenov. On one part, Stanislav is extending the beam model developed in his PhD, i.e. he is



deriving the equation of motion of tapered and initially twisted beams with arbitrary cross sections, by using the p-version FEM. On the other part, Stanislav is implementing the shooting and continuation methods within Elmer software, and adopting these methods for parallel computations. This work will allow him to investigate the dynamics of any structure modeled by three-dimensional finite elements.

## Short Term Incoming Visits

In the period of 4-7 March 2013 IICT-BAS was visited by **Professor Petrica Pop** from the Department of Mathematics and Computer Science of the Technical University of Cluj-Napoca, North University Center of Baia Mare, Romania. During his stay at IICT-BAS Prof. Pop had professional discussions with some leading IICT scientists. Possible directions for future co-operative work have also been outlined.



Prof. Pop presented two lectures:

- *Research trends in Combinatorial Optimization (5th March 2013)*
- *On the Generalized Vehicle Routing Problem (6th March 2013)*

## Outgoing Secondments

In the period 03.03 – 23.03.2013 **Prof. Krassimir Georgiev** visited the Fraunhofer Institute for Industrial Mathematics (ITWM), Department of Flow and Material Simulation, Kaiserslautern, Germany, which is a partner in AComIn Project in Advanced Computing. During his visit he had been working with the German colleagues in the field of mathematical and computer modeling of some convection-diffusion-reaction problems in porous media and their efficient implementation on parallel computers. He participated in discussions concerning the future joint research between the groups in the area of scientific computing and development of new supercomputer applications for industry, medicine and ecology. He gave a talk at a seminar on "Scientific and Parallel Computing in IICT-BAS: Infrastructure, Projects, Results".



## Upcoming Events Partially Supported by AComIn

**The 9th Int. Conference "Large-Scale Scientific Computations" (LSSC 2013)**, (<http://parallel.bas.bg/Conferences/SciCom13>) will be held on June 3-7 2013 at the Bulgarian Red Cross Educational Center in Sozopol - a picturesque town on the Black Sea coast. Traditionally the Conference gathers researchers working on large scale computer simulations and high performance computer architectures and algorithms. The Conference Proceedings will be published as a special volume of Springer Lecture Notes in Computer Science (LNCS).



**The 1st Int. Workshop "Information and Communication Technologies for Human Health and Quality of Life"** (<http://www.iict.bas.bg/acomin/15-17-May-2013/Workshop-ICT-HuHeQuL.pdf>) will be held on May 15-17 2013 at hotel "Armira" in Stara Zagora Mineral Baths. The Workshop aims at demonstrating advances in ICT applications for improving human health and life quality. The selected papers will be published in a special issue of the IICT "Cybernetics and Information Technologies" journal.