

# FRUCT: EU-Russia Cooperation in the Open Innovations Format

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## Abstract

Continuous development of the partnership between industrial and academic research is a key factor required to support further growth and success of the innovation ecosystem.

Scientific groups in universities and other academic organizations usually have not strong enough connections to the existing industries, which benefit from early access to the research results and information about main trends. Many research groups are active in applied their results, but to be efficient and grounded they need from industry information about up-to-date trends and promotion of their solutions. At least one more key issue for strengthen the connection between academia and industry can be mentioned. It is narrowing the time frame between a moment of innovation and its adoption by the industry.

According to the points listed above we decided to build an open innovation framework targeted in developing partnership between industrial and academic research, which should help to find right research partners and simultaneously discover and incubate new competences.

Nowadays the USA universities are the recognized leaders in adaptation of the academic research and education to the existing industrial needs. This situation creates a strong demand for quick and adequate actions from universities in Russia and Europe. A number of cooperation frameworks have been built inside the EU; however, the cooperation between Europe and Russia is still leaves a lot to be desired. This creates a historical chance for Finnish universities to use geographical proximity and traditionally good relations with Russian colleagues to strength Finnish science, help Russian universities to stronger integrate to the EU academic institutions and as a result contribute in development of the bridge between academic worlds of EU and Russia.

FRUCT actively involves in the research process students and postgraduates as well as forms a research work groups for solving high-technology problems in IT area. There are two more aims to enhance interest to science and to build convenient infrastructure for collaborative and effective realization of the distributed research projects.

Today among the FRUCT participant there are 21 research teams from the universities of Russia, Finland, Ukraine and Denmark that makes the program one of the most important programs in Europe on cooperation in the area of telecommunication. This article represents an overview of the FRUCT program, its projects, achievements, activities, the latest news and the current step of development.

**Index terms:** R&D, education program, industry and academia cooperation.

## I. INTRODUCTION

The FRUCT program was established in 2007 by the group of enthusiasts and on its first steps was supported by the Nokia Research Center, Saint-Petersburg University of Airspace Instrumentation and University of Turku. At the moment the FRUCT community consists of representatives of 21 universities from Russia, Ukraine, Finland and Denmark, three industrial companies (Nokia, Nokia Siemens Networks и Symbian Foundation) and R&D center of Russian Academy of Science. Not long ago FRUCT and IEEE Communications Society [1] officially became the sister societies. FRUCT association runs over 50 projects, publishes over 70 papers per year, participates and wins in many contests and so on. That makes FRUCT be one of the most significant and actively growing cooperation frameworks of the leader of ICT industry and universities in Baltic region.

The FRUCT program is built on the principles of voluntary communities of practice formed from the organizationally independent research teams and oriented on the collective achievement of collaborative goals [2], [3], [4], [5]. The function basis of the program is a principle of joint research and development in the open innovations format [6], [7].

The main goals of FRUCT program include:

- identifying world-class R&D teams interested in such form of cooperation;
- creating the new competences and corresponding niches for R&D cooperation;
- providing a chance for students to realize their scientific and R&D ambitions;
- developing long-term strategic partnership between industry and universities;
- promoting idea of Europe without borders and corporate social responsibility.

To achieve the above state goals, the FRUCT community:

- actively participates in development of the scientific, research and training ecosystem of the region and helps to renew training courses;
- helps to establish important connections between industry and academic experts and the research groups;
- promotes information on the latest industrial trends, ongoing cooperation projects and other types of new opportunities that are arising in the region;
- forms teams for performing research and development for most advanced and highly risky topics with high extent of uncertainty;
- arises the prestige of the scientific research and helps to engage students and postgraduates in the process;
- helps keeping strong ties between top young graduates/researchers and their universities.

The FRUCT framework particularly focused on development of the following three components: training, research and infrastructural components.

The main focus topics developed within scope of the training component are as follows:

- development of new courses and advanced training programs for the regional technical universities;
- active contribution to development of the new educational standards and promotion of ideas on integration of the new technologies into the classical disciplines;

- activation of the intercollegiate exchanges of lectures and courses;
- support of students and postgraduates exchange, organization of the new multi-site MSc programs for exchange students;
- regular organization of summer and winter schools and trainings that are open for all interested students and university staff.

The key priorities of FRUCT research in 2011 are as follows:

- mobile healthcare (m-Health) research and development of the prototype solutions for new medical services and so moving diagnostic e-medicine to the new level;
- research and development of ubiquitous architectures and Smart Space technologies;
- practical research in the field of the cross-platform development for devices with the significant variation of technical characteristics;
- research and development of network technologies and solutions for Embedded Networks;
- research and development of the socially-relevant and ecology-aware mobile service and solutions and promotion of use of the energy-saving technologies.

Information about the main principals implemented in FRUCT, its organizational structure and internal management, the list and description of completed and under development projects, as well as links to the main supporting recourses can be found on the main web page of FRUCT program [8].

## II. MAIN PART

### *A. Support of Research*

It is well known that universities often experience difficulties in keeping best students at the departments. The close partnership with industry provides association with a strong brand, challenging and concrete research and development tasks and additional resources, which attracts students and helps to solve resourcing problem. On the other hand, the companies are interested in long-term and high-risk research done by the universities, and benefit from getting closer to the edge of science, to allow faster adoption of new key scientific findings. Also the early industrial feedback is in mutual benefit as it enables correct tuning and presentation of result of the new findings to make them more clear from technological point of view. We believe that development of closer cooperation between the academic and industrial research, be more open and active in joint activities, getting stronger visibility by making joint publications and so on, these all are in the strong mutual benefit.

The goal of FRUCT program is development of the long term partner relations between the participating teams. For reduce initial costs and lowering partnering-building thresholds and level of the mutual obligations, the FRUCT program is using principle of short- and medium-term non-commercial technology exploration projects. Usually students and postgraduates of the partner universities take the main role in development of such projects. The experts from industry or academy take role of scientific advisers and FRUCT help each project to find experts that have the best match of competences to the project focus topic. Recent development has discovered that such kind of partnership

is very effective as it helps to clearly formulate and prepare the most interesting and perspective research areas for further collaborative development.

The themes of the new FRUCT projects could be proposed by academic and industrial experts as well as by students and postgraduates. All proposed projects are taken through the content verification and approval process. The preference is given to the most clearly formulated proposals that address risky and high-technology topics and have good scientific potential. The main target of FRUCT projects is facilitating of the appropriate competences in the universities, acquaintance of academic and industrial groups and incubation of full-scale project proposals for further scientific and business cooperation.

Projects approved by FRUCT experts are getting support in the form of materials required for implementation of the projects (books, devices and etc.), advices and support of the experts and sometimes even financial support in the form of grants and scholarships. It is important to say that industrial partners are not pretending to the intellectual results, which were obtained during the research and development process of the FRUCT project.

According to FRUCT rules each project shall result in at least one publication, which after internal review will be recommended for further publication in IEEE Xplore or after requested improvement to be submitted to a prestigious international conference or scientific journal. If the paper is accepted to the recommended conference then a Russian student or postgraduate - the most active author of the paper, who also done significant contribution to the project work, can apply for the financial support of the trip to conference. For example, only during the first half a year of existence of such opportunity FRUCT had got 7 applications for the travel grants and all of them were granted. As a result one paper was presented on the DSS 2008 conference in the USA and 6 papers were presented on the WPMS conference in Lapland where FRUCT for the first time got a right to organize its own session. Nowadays FRUCT sessions and seminars are organized in co-location with 7 conferences and the number of partner conference is growing. Also FRUCT has agreements with more than a dozen of conferences that provide free registrations or good discounts for FRUCT participants.

FRUCT is an official sister society of IEEE Communications Society [1] in the region that includes Russia, Finland, Ukraine and Denmark. This gives the program members the huge additional opportunities for publication of their works in the IEEE associated editions and discounted participation in IEEE events.

The long-term mission of FRUCT is creation of a network of research teams and laboratories, which will be formed from the representatives of the European and Russian universities and supported by industrial experts. FRUCT provides a set of tools and a framework for the member teams to help setting effective collaboration, formulate directions for joint work, get know each other and put trust in place and in advance distribute roles in the full-scale cooperation projects. As a result we see development of a core of R&D consortiums that can develop broad scope of projects and are strong teams in competition for Russian and European grants for fundamental research and development.

The basic network of FRUCT laboratories is built already and it includes the following units: Open Source Solutions laboratories at PetrSU (<http://oss.fruct.org>), Wireless laboratory at NNSU (<http://wl.fruct.org>), Open Source and Linux laboratory at SPbETU "LETI" (<http://osll.fruct.org>), research and development laboratory at YarSU (<http://yar.fruct.org>), embedded computing for mobile communications

(<http://fruct.org/emcomobile>) and mobile applications laboratories at SUAI and Smart Spaces group in SPIIRAS. These laboratories play the key role in regional promotion and development of FRUCT principles, actively contribute to the work of FRUCT working groups, run a number of projects and support regional professional communities. These activities increase level of professional preparation of researcher and developers by the universities. The laboratory students get an opportunity to follow the latest trends in IT, which gives great benefit and support to the IT-parks and business incubators that are usually co-located with the universities.

### *B. Support of Training*

The key element of the FRUCT training activities is the main FRUCT conferences that are organized once every half a year in Russia in the spring time (usually last week of April) and in Finland in the autumn (usually 2<sup>nd</sup> week of November). The second core element of the developed training ecosystem is a system of technological trainings, which are organized every month in different regions of Russia and Europe. Also FRUCT supports advance courses on technologies, which are regularly given in the partner universities, with help of experts from industry and invited lecturers from other member universities.

The FRUCT conferences and trainings are free of charge and provide an excellent opportunity to publish student results in FRUCT proceeding and get certificates for participation in trainings and developer/research contests.

Programs of FRUCT conferences are formed from the lectures on the hottest, most significant and relevant problems faced by the IT science and industry. The invited lectures include the leading Russian and European academic and industrial experts.

Another way that supports training in FRUCT is regular status updates and reports delivered by the FRUCT working groups. The main part of the conference content consists of presentations of the status and results of FRUCT projects and demonstration of the developed solutions. Also FRUCT conferences provide an opportunity for independent developers and groups to represent results of their work and find interested partners and support from the FRUCT member teams.

Another key element in the FRUCT training ecosystem is summer and winter schools. Duration of the schools vary a lot depending on time of the year, subject and host university, e.g. it could be one-week school with very intensive studies (12 hours of studies and trainings per day) or three-week school with social events and community building activities. All FRUCT schools are open and free for FRUCT members. Sometimes, thank to support of our patrons we are even able to provide grants to cover travelling and living expenses.

### *C. Professional Communities*

An important mission of FRUCT is support and coordination of the work of professional communities. Currently FRUCT supports the following four communities: Russian Mobile Linux (MeeGo/Maemo) community, Russian Qt community, Regional Mobile Healthcare community (m-Health) and Regional Smart Spaces community «Are You Smart» (ruSMART).

FRUCT provides coordination and management support to the listed communities and together they form East-West Research and Education Society on Telecommunications [9]. Such organization allow for each community to preserve its own identity, follow internal policies, have community web, e-mail and other resources. Here is the list of resources of the E-WeREST communities:

- Russian Mobile Linux (MeeGo/Maemo) community <http://meego.e-werest.org> and <http://wiki.fruct.org>;
- Russian Qt community <http://qt.e-werest.org>;
- Regional Mobile Healthcare community (m-Health) <http://mhealth.e-werest.org>;
- Regional Smart Spaces community «Are You Smart» (ruSMART) <http://rusmart.e-werest.org>.

These sites are devoted to the discussion on the latest developments in the corresponding fields, development of common vision of the key advantages and disadvantages of the most popular solutions, translations of important articles and overview of the most interesting external resources on the theme, presentation of the new solutions developed by the community and discussions on the closest competitor technologies and solutions.

The long-term support and development of the Russian Mobile Linux community, which was first focused on Maemo than expand scope to MeeGo OS and currently addressing all top Mobile Linux solutions is one example of the complex and long-term work that was done in partnership with many industrial parties and with strong support of Nokia. As we can see now, collaboration in this field is useful not only for developers, but even for the regular users of devices with mobile Linux platforms.

In 2011 FRUCT together with Russian Qt community and Nokia organized a systematic work on popularization of Qt platform in Russia. From February, each 3-4 weeks special trainings on Qt are taking place in different regions of Russia (<http://fruct.org/qt-tour>). These trainings are free of charge for all participants and in the end of each we organize contests for Qt developers with good prizes for the winners. Also with support of professional communities FRUCT organized a set of large events, such as Russian MeeGo summit (<http://fruct.org/meego1>), Regional MeeGo summit Russia-Finland in Petrozavodsk (<http://fruct.org/conference9>), winter and summer schools on Qt in St.-Perersburg (<http://fruct.org/QtSummer>), summer school on advanced Qt in India (<http://www.fruct.org/india2011>) and many other events. The participants of such events are international experts on MeeGo and Qt-technology, regional leaders of ICT resources, representatives of academy from different universities and people from top IT companies, such as Nokia, Intel and so on.

Also communities organize regular large open contests for developers on the best solution, for example, contest for the best Russian Qt application <http://fruct.org/winQt> with the total prize fund of 200'000 rubles.

### III. CONCLUSION

The main aim of the article was to make an overview of the FRUCT basic principles and the current status of ongoing activities. In one article it is very difficult to cover all directions in details so welcome you to learn more about the program from the web site [8]. The FRUCT program is open and free for participation for the university teams. Members of the program gain significant benefits and support in collaboration with

research groups from IT industry, top regional universities, access to the materials on the new technologies and an opportunity to collaborate with IEEE ComSoc.

Enrollment of the new participants is possible only by the invitation from the organizing committee, but so far all university teams that were interested and ready to follow FRUCT principles were invited to the program. If you have any questions or comments, please send them to e-mails of paper authors. We will be glad to see new FRUCT members and work together to further expand our open innovation network.

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