

Finnish-Russian University Cooperation Program in Telecommunications (FRUCT)



Mission

- Help in building bridge between Finnish and Russian academic worlds
- Increase visibility of involved research teams in both countries and help in establishing direct personal contacts
 - Support publishing best student works at world top conferences
- Exchange experience and best practices in education and R&D
- Establish direct contacts between university and industry people
- Promote telecom and mobile devices oriented research and technologies
- Involve students in industry oriented research projects
 - Provide students with advanced technological training
 - Find best university and industry supervisors for the student projects
 - Help to identify niches for new startups and show what support students can get if they decide to establish own business
- Provide students with a framework for realize their R&D ambitions
- Make this program be an “incubator of new competences”



History and Background

- The program started as collaboration project between Turku University (TUCS) and St. Petersburg State University of Airspace Instrumentation (SUAI)
- In 2006 Nokia's University Collaboration program in Russia joined the program
 - Together we decided to go for open academic-industrial association in Telecom
- The program is primary targeted in Russian and Finnish academic participants, but participation from other countries is also welcome
- We are targeted in exchanging and developing competences that is achieved by making joint projects and organizing regular info sharing events (seminars)
- Before it takes final shape we will keep FRUCT informal and fully open program
 - There is no formal agreement and membership fee, if your university team wants to join us, just define in what activities you want to participate and let us know
- The program defines two levels of membership
 - Full-members – expected to be active in program activities between the meetings, participate in project work (with students and professors) and seminar preparation
 - Observers – welcome to follow program's progress and participate in seminars



Program Members

- **Full-members**

- **University members**

- [University of Turku \(TUCS\)](#), contact person: [Alexey Dudkov](#)
 - [St. Petersburg State University of Airspace Instrumentation \(SUAI\)](#), contact person: [Sergey Semionov](#)
 - [St. Petersburg State Electrotechnical University \(LETI\)](#), contact person: [Dmitrij Gaivoronskij](#)
 - [University of Oulu](#), contact person: [Behnaam Aazhang](#)
 - [Helsinki University of Technology \(HUT\)](#), contact person: [Natalia Ermolova](#)
 - [St. Petersburg State Polytechnic University](#)

- **Industry members**

- [Nokia Research Center & Universities Cooperation Program in Russia](#), contact person: [Sergey Balandin](#)

- **Observers**

- **University members**

- [EVTEK university of applied sciences](#), contact person: [Ingmar Tollet](#)
 - [Bonch-Bruevich St. Petersburg State University of Telecommunications](#), contact person: [Alexey Grudinin](#)



How does it work

- Any representative of the full-member organization can propose a new project
- Project can be initiated by professor, industry expert or by any student
 - When professor initiate a project, he/she has to become supervisor of the team
 - When project proposal comes from industry expert, he/she takes obligation to be team's tutor
 - When students come with idea of new project they can ask for supervisor and/or tutor from FRUCT board
- Project teams can ask FRUCT board for professional advices, results review and other types of help and support, including different types of donations (books, devices, etc)
- The expected main project deliverable is a paper, but depending on the project scope some other deliverables are also possible and appreciated
- Yearly we organize two educational & info sharing seminars (in Russia and Finland)
 - To seminars we invite top experts with lectures on the subjects of program projects
 - The seminar is a place where teams can present their project progress and results
 - The next seminar will be held in May 2008 in St-Petersburg, Russia
- Based on seminar presentations FRUCT board might recommend some papers to publication at world top conferences and Nokia allocates couple of travel grants for this
- For more information about program's structure and work principles please refer to www.fruct.org



Focus Areas

- Modulation, signaling and multiple access formats (spread spectrum, OFDM, CDMA, multi-carrier CDMA, etc.)
- Signature ensemble design for high-rate multi-user data transmission
- Practicable codes and coded-modulated constellations nearing channel capacity
- Signal and processing algorithms design for channel piloting and synchronization
- MIMO architectures and space-time coding schemes applicable to 4G interface
- Advanced multi-user receive algorithms
- Simulation of 4G channels and proposed transmit/receive architectures
- Embedded networks
- Service design and development

and other areas interesting for students, supervisors and tutors ...



List of Projects

1. WiFi throughput during wireless video transmission
2. Laboratory of video transmission
3. Coding in 4G
4. Mobile multimedia broadcasting technologies
5. System level simulator for hybrid broadcast/cellular networks
6. Bandwidth and power efficient OFDM
7. Resource allocation in OFDMA
8. Security in Embedded Networks
9. Software licensing in mobile industry

10. Video streaming for cellular systems
11. Nokia Widsets service investigation



Contact Information

www.fruct.org

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Coordinator in Russia:	Sergei Semionov	<u>simon@vu.spb.ru</u>
Industrial coordinator:	Sergey Balandin	<u>Sergey.Balandin@nokia.com</u>

Lets make together FRUCT be fruitful cooperation framework!



Seminar program, Day 1 (November 7, Wednesday)

9:45	1.0h	Mobile Trusted Module, Jan-Erik Ekberg, Nokia
10:45	15m	Coffee-break
11:00	1.5h	Resources and paths of modernization of user interface of GPS. Valery Ipatov, University of Turku/St. Petersburg Electrotechnical University "LETI"
12:30	1.0h	Lunch, ICT-restaurant
13:30	1.0h	Embedded networks. Michel Gillet and Sergey Balandin, Nokia
14:30	15m	Security in embedded networks. Elena Reshetova, St. Petersburg University of Airspace Instrumentation
14:45	15m	Experimental wireless channel model derivation. Sergey Andreev, St. Petersburg University of Airspace Instrumentation
15:00	15m	Research in telecommunication laboratory at University of Jyväskylä. Olli Alanen, University of Jyväskylä
15:15	15m	Research activity at Institute of Communications Engineering. Tampere University of Technology. Yevgeni Koucheryavy, Tampere University of Technology
15:30	15m	Traffic transmission optimization via wireless networks using cross-layer techniques. Yevgeni Koucheryavy, Tampere University of Technology
15:45	15m	Coffee-break



Seminar program, Day 1 (November 7, Wednesday)

16:00	1.0h	Resource management and QoS in 802.16d/e and multi-hop 802.16j networks. Alexander Sayenko, Nokia
17:00	15m	MAC protocols for broadband wireless networks: overview of ongoing research and open problems. Alexey Vinel, Institute for Information transmission problems, Russian Academy of Sciences
17:15	15m	Optimal MAC PDU size in 802.16 networks. Henrik Martikainen, University of Jyväskylä
17:30	15m	Performance evaluation of 802.16 ARQ mechanism. Vitaliy Tykhomyrov, University of Jyväskylä
17:45	15m	Optimal uplink subframe structure for WiMAX MAC protocol in PMP mode. Alexey Vinel, Institute for Information transmission problems, Russian Academy of Sciences
18:00	15m	Video surveillance networks. Aleksandra Karimaa, University of Turku

Seminar program, Day 1 (November 7, Wednesday)



18:30	30m	Turku sights bus tour
19:00	1.0h	Buffet dinner at Aula Café, Itäinen Rantakatu 4-6, http://www.aulacafe.fi
20:00	1.0h	Guided tour at Aboa Vetus (Old Turku) museum
21:00	2.0h	Cocktail reception at Aula Café