



Newsletter June 2016

from
the ITS Postgraduate school
(NFITS)

It has been a good year

Research and education is very important for the development, implementation and use of ITS. The aim of the ITS Postgraduate school is to contribute to this development, primarily through improved PhD-education and research. Since the start in 2008, we have seen 9 PhD-students receiving a Doctoral degree and in addition we have had 3 PhD-students receiving a Licentiate degree. The dissertations and research papers of these students cover many aspects of the ITS field and hopefully the research will make an impact. What we know for certain is that the graduates themselves will make an impact. The most valuable result from a PhD-project is often the person herself and all the achievements this person will make in the future based on the knowledge obtained during the PhD-studies. The ongoing work to develop the national ITS Strategy and Action Plan is very important for the future introduction of ITS, and in this work research and education are emphasized as key enabling factors. The ITS Postgraduate school looks forward to contributing to this development.

During spring 2016 one PhD (Shoaib Bakhtyar) and two licentiate defences (Qichen Deng and Andreas Allström) were made. The content of their research is presented below. The main event during the spring was the annual workshop of the Postgraduate school where the PhD-students presented their research and received feed-back from other PhD students and senior researchers. At the moment there are 11 PhD-students enrolled, but we know there is a number of PhD-projects starting during the fall and we expect several new PhD-students to enrol during 2016.

All projects

The current research projects of the PhD students associated with NFITS are as follows (where the PhD students' names are given in parenthesis):

1. ITS services and decision support for freight transportation

- a. Electric Fleet Optimization in Real-Time (Rafael Basso)
- b. Real-time Access and Guidance Control (Stefan Jacobsson)
- c. Enhanced Transport Security and Efficiency for HazMat (Camilla Magnusson Nyquist)

2. ITS services and decision support for public transportation

- a. Multi-Agent Based Simulation of Commuting in Urban Areas (Banafsheh Hajinasab)

3. Traffic management and traffic information systems

- a. Calibration of Dynamic Traffic Assignment models (Athina Tympakianaki)
- b. Digital infrastructure for railway traffic management (Talin Jadaan)
- c. Travel demand analysis based on large scale sensor and cellular network data (Nils Breyer)

4. Automation, driver support and road traffic safety

- a. Cooperative systems (Ellen Grumert)
- b. Reliable vehicular communications (Nikita Lyamin)
- c. Advanced rider assistant systems for improving motorcycle safety (Noor Azreena Kamaluddin)
- d. Development of Methods and Tools to Analyse Traffic Safety of Vulnerable Road Users (Carl Johnsson)

If you are interested in reading the theses or other publications associated with the PhD students, please visit the publication list on our website <http://www.its-sweden.se/Forskarskolan>

Thesis presentations



Shoaib Bakhtyar, at Blekinge Institute of Technology defended his PhD-thesis on May 17 with the title “Designing Electronic Waybill Solutions for Road Freight Transport”

Summary: In freight transportation, a waybill is an important document that contains essential information about a consignment. The focus of this thesis is on a multi-purpose electronic waybill (e-Waybill) service, which can provide the functions of a paper waybill, and which is capable of storing, at least, the information present in a paper waybill. In addition, the service can be used to support other existing Intelligent Transportation System (ITS) services by utilizing on synergies with the existing services. Additionally, information entities from the e-Waybill service are investigated for the purpose of knowledge-building concerning freight flows.



Qichen Deng, KTH Royal Institute of Technology presented his licentiate thesis on March 8 with the title “Heavy-duty vehicle platooning - modeling and analysis”

Summary: The research concerns heavy-duty vehicle (HDV) platooning and consists of three parts. The first part focuses on development of a simulation platform for study of HDV platooning. This includes modeling of HDV platoon and its operations, investigation of cooperative adaptive cruise control specifically for HDV platoons and study of HDV platooning on fuel saving. In the second part, the HDV platoon formation considering the influence of traffic is modeled and the impacts of HDV platoon spacing policy on steady-state traffic flow is analyzed. In the third part, the HDV platoon disaggregation is applied on highway off-ramp using the simulation platform and the outcomes are investigated.



Andreas Allström, Linköping University, presented his licentiate thesis on May 26 with the title “Highway Traffic State Estimation and Short-term Prediction”

Summary: Information about the current and future traffic state is an essential input to a traffic management centre and can be used to control the traffic, to influence the choices made by the travellers and in this way improve the traffic conditions. The objective of this thesis is to contribute to the development and implementation of a model for estimation and prediction of the current and future traffic state and to facilitate an adaptation of the model to the conditions of the motorways in Stockholm. The model can handle and take advantage of many types of traffic data, both fixed sensor data and probe data. The research has been made within the project Mobile Millennium Stockholm in cooperation with Trafikverket.

Research visit



Athina Tympakianaki at KTH Royal Institute of Technology made a three months' research visit at Northeastern University, Boston, USA between Dec 2015 and March 2016. She gives a brief summary of her visit here:

I was part of the exchange visiting program, which aims at promoting interactions between people of the United States and other countries through education and cultural exchanges. I had the opportunity to interact with American and international PhD students not only from the transportation field but also from other disciplines. We had informal discussions about our research topics, where I presented my work. Moreover, we shared our experience and views regarding the work and social PhD life in Sweden and USA. Being among the best universities worldwide (e.g. MIT, Harvard) I had the opportunity to attend seminars given by outstanding professors in topics related to my research. During the last year I had also the opportunity to participate in a research project with Google, within which I had the chance to be in the Google office in Boston and meet with software and research engineers. I introduced them to the research field of traffic engineering and transportation in general, and discussed about the connections and collaborations that are being more and more developed between industry and academia. Moreover, during my study visit I had direct interactions with the company Caliper, which developed the traffic simulator TransModeler that I am using in my PhD research. Their support to the project was valuable.

Overall, my study visit at Northeastern University was a great opportunity to experience a different country, as well as a different working and academic environment. Being among one of the most academic and multicultural environments, such as Boston, broadened my horizons in different perspectives. The interactions with researchers from different universities and companies strengthened my motivation to continue doing research. Moreover, new connections and potential collaborations can be established. I am therefore thankful to the ITS postgraduate school of Sweden for the partial financial support for this trip and I strongly encourage other students to take this opportunity during their PhD studies.

The annual workshop

The workshop was held in 12-13 of May in the sunny Skåne in the south of Sweden. Eight PhD students and eleven senior scientists participated where the PhD-students presented their research topic and received feed-back from the other PhD students and the senior scientists. Also, team-building activities were carried out by all participants.

Other notes from the Spring 2016

- Researchers in NFITS have received financing for several project that can lead to additional PhD-students joining the school:
 - Clas Rydergren, Linköping University, for the project "Traffic Effects of Automation" (together with Johan Olstam, VTI) from Trafikverket
 - Chalmers University (Stig Franzén and Per-Olof Arnäs) will participate in a large EU-project focusing on "Digital ecosystems for the transportation of goods"
 - Henrik Sternberg has received a project from Vinnova with the title "Transparent Transport System" (together with Magnus Andersson, Victoria Swedish ICT)
- Two of our PhD-students, Nikita Lyamin and Quichen Deng, has worked together in Halmstad during some months and written a joint paper.

Preliminary plans and activities for NFITS for the Fall 2016 and Spring 2017

- The Swedish Transport Research conference is held in Lund October 18-19. Four PhD-students from NFITS will present their research at the conference.
- The national ITS conference is held in Stockholm October 25-26
- A new round of the basic PhD-course "Introduction to ITS" will start in the spring 2017.
- The annual workshop in 2017 will be held on the west coast with Halmstad University as host.

**Finally, we would like to wish you a nice summer holiday
and thank all of you whom have been involved in NFITS.**

Especially, we would like to thank VINNOVA, Trafikverket and ITS-Sweden

About the Swedish ITS Postgraduate school - NFITS

The area of Intelligent Transportation Systems and Services (ITS) is known to be multi-disciplinary where different areas of competence meet to achieve sustainable, safe and cost-effective traffic and transport systems. The research frontier in the ITS area has earlier primarily been divided according to the different disciplines while there has been a need for research projects and researchers which go beyond their specific domains with a wider perspective to address relevant issues in a larger context than before. The primary purpose of the ITS Postgraduate School is therefore to strengthen the Swedish research education within ITS by providing a good, multi-disciplinary virtual research environment and a platform for cooperation between researchers in different areas of competence. Another important objective is to initiate and run research projects highly relevant for the industry and the society. For more information, please visit our website <http://www.its-sweden.se/Forskarskolan>.

Below is a list of the PhD students associated with NFITS, where * indicates NFITS alumni (with a licentiate or doctoral degree). For the alumni the current employer is indicated in brackets.

| | |
|------------------------------|---|
| Gideon Mbiydzenyuy* | Blekinge Institute of Technology (Netport and Borås University) |
| Shoaib Bakhtyar | Blekinge Institute of Technology |
| Tor Skoglund* | Chalmers University (Sweco) |
| Niklas Strand* | Chalmers University (VTI) |
| Stefan Jacobsson | Chalmers University |
| Rafael Basso | Chalmers University |
| Nikita Lyamin | Halmstad University |
| Jana Sochor* | KTH Royal Institute of Technology (Chalmers University) |
| Mahmood Rahmani* | KTH Royal Institute of Technology |
| Athina Tympakianaki | KTH Royal Institute of Technology |
| Qichen Deng | KTH Royal Institute of Technology |
| Lars Backåker* | Linköping University |
| Andreas Allström | Linköping University (Sweco) |
| Ellen Grumert | Linköping University |
| Nils Breyer | Linköping University |
| Annika Larsson* | Lund University (Autoliv) |
| Omar Bagdadi* | Lund University (Transportstyrelsen) |
| Camilla Nyquist Magnusson | Lund University |
| Noor Azreena Kamaluddin | Lund University |
| Carl Johnsson | Lund University |
| Banafsheh Hajinasab Razlighi | Malmö University |
| Åse Jevinger* | Malmö University (Malmö University) |
| Taline Jadaan | Viktoria Institute |

The ITS Postgraduate School is mainly funded by VINNOVA and Trafikverket which are represented in NFITS by Eva Schelin (VINNOVA) and Bengt Hallström (Trafikverket). The work in NFITS is planned and executed by a research council (Sw. Forskarutbildningsråd, FUR) which is composed of the following members during 2016:

Christer Karlsson, ITS-Sweden
MariAnne Karlsson and Stig Franzén, Chalmers University
Per-Olof Arnäs, Chalmers University
Alexey Vinel, Halmstad University
Albania Nissan, KTH Royal Institute of Technology
Jan Lundgren and Clas Rydergren, Linköping University
András Várhelyi and Henrik Sternberg, Lund University
Paul Davidsson and Jan Persson, Malmö University

NFITS is coordinated by ITS-Sweden.

The director of the ITS Postgraduate School is Prof. Jan Lundgren, Linköping University.