

# A?

Aalto University

# Research – a good thing Research collaboration – a better thing!

*TransSmart seminar, on Feb 16, 2017*

*Kari Tammi*

*Associate Professor*

*+358 50 348 7902*

# Why?

**Make Finland to succeed!**

**We may be in deep trouble with CO<sub>2</sub>,  
emissions and resource sufficiency**

**Urging to find sustainable lifestyle**

**Political decisions related to transport seem sometimes  
to lead a hassle**

**Transport systems are not always delivered on time**

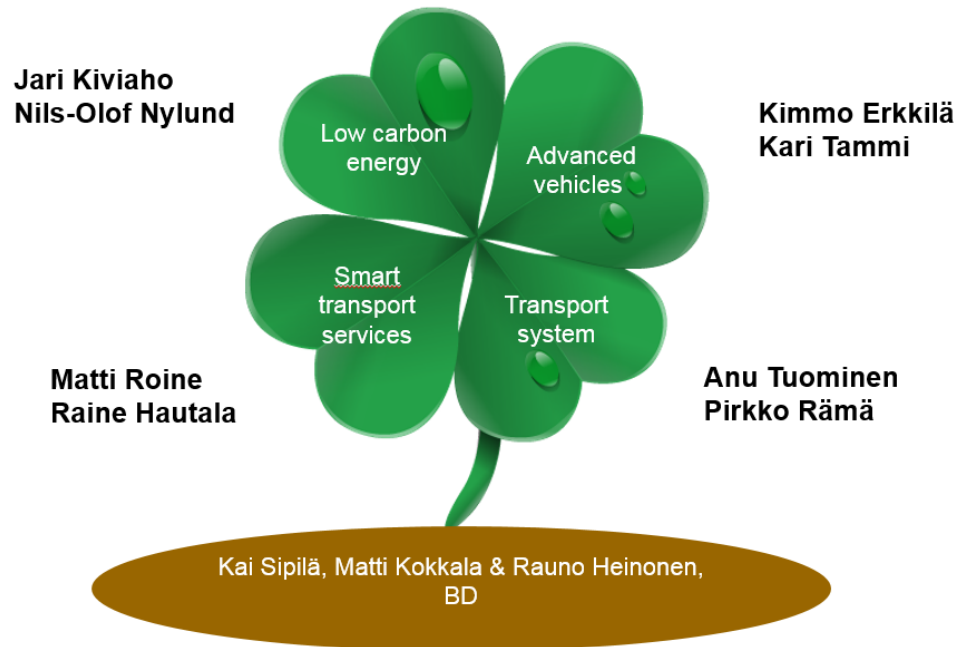
# History: planning TransSmart, late 2012

VTT Smart Mobility Integrated with Low-carbon Energy  
“SMILE”

CARBON FOOTPRINT

# TransSmart core team in 2012

## Core team - preliminary



# Activities in Aalto University

# Transportation Engineering – Claudio Roncoli



## Education and professional background

- *BSc (2006), MSc (2009), PhD (2013) in Computer Engineering from the University of Genova, Italy. PhD on Management of Transportation Systems*
- *Postdoctoral Researcher (2013 – 2016) at Technical University of Crete, Greece. Working on the project TRAMAN21 (TRAffic MANagement for the 21st century)*
- *Since October 2016, Assistant Professor in Transportation Engineering at Aalto University.*

## Research

- ***Motorway traffic management** for real-time traffic operations*
- *Impact of **connected** / **automated vehicles** on traffic*
- *Strategies for **future traffic management***
- *Methodologies for **sustainable transport** and risk management*

# Transport Systems Planning – Milos Mladenovic



## Education and professional background

- *BSc (2009), Transportation Engineering, University of Belgrade*
- *MSc (2011), PhD (2014), Civil Engineering, Virginia Tech*
- *Since October 2014, Assistant Professor in Transport Systems Planning at Aalto University*

## Research

- *Transitions to transport systems with **self-driving vehicles***
- *Development of **integrated** and **flexible transport services***
- *Analysis of system-level and **user mobility behaviour***
- *Transport systems **planning and modelling***

## **Combustion, emissions:**

- profs. Martti Larmi, Ville Vuorinen

## **Energy and systems:**

- profs. Sanna Syri, Raimo Lovio

## **Marine:**

- profs. Pentti Kujala, Jani Romanoff, Heikki Remes

## **IoT:**

- profs. Martti Mäntylä, Petri Kuosmanen

## **Autonomous machines/vehicles:**

- profs. Arto Visala, Ville Kyrki



# Mechatronics – Kari Tammi



**Kari Tammi**, Aalto University  
Aug 2015-  
Earlier Research Professor at VTT



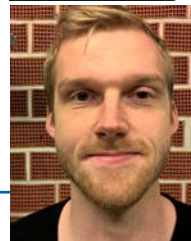
**Panu Sainio**, Chief Engineer,  
expertise: vehicle technology,  
hybridization, electric powertrain



**Jari Vepsäläinen**, Multi-objective  
robust design of electric powertrain



**Klaus Kivekäs**, Electric powertrain  
optimization with statistical methods



**Jyry Hyvärinen**, Control of electric  
moped performance over internet

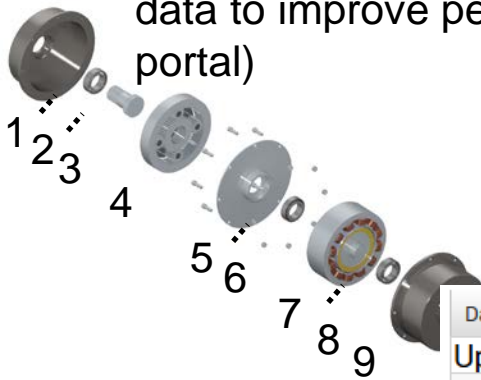


Teaching: Mechatronic machine design (5 cr),  
Vehicle mechatronics (5 cr)  
IIT Guwahati, India: Design of electric vehicle  
systems Nov-Dec 2016



# Research interests in the field of mechatronics

- Robust design of electric powertrain
- Rotordynamics and self-bearing machines
- Energy efficiency in machinery
- New powertrain designs
- Industrial internet (IoT) connection for data to improve performance (Linkker portal)



## Selected MSc theses in 2016

Mäntylä. *Design of a high-speed propulsion induction motor*

Anttila. *Uncertainty in electric bus driving cycles*

Vähätalo. *Sotilaspyöräajoneuvon moottorin osakokonaisuuksien modulaarisuuskartoitus*

Posa. *Henkilöautojen kolarivauriokäsittely kiertotaloutena*

Syvänen. *Evaluation and development of the over-run test of studded tyres*

Kivekäs. *Estimation of Tire-Road Friction Potential Based on Inertial Sensor Measurements in Low-Friction Conditions*

Markkanen. *Sähköautojen akkujen kiertotalous*

Mälkönen. *Energy consumption of passenger vehicles on standard test cycles*

Data tag	Value	Trend
Uptime_hours	1 h	
SOC	67 %	
Battery Voltage	698 V	
Max Cell Voltage	2331 mV	
Min Cell Voltage	2326 mV	
Min Cell Temp	17 C	

# Success examples

# Electric bus





# Armoured vehicle

# Tositoiniin



**Thank you  
What next?  
Let's continue  
collaboration**