



# Workshop: “Subliminal Perception in Cars”

**AutomotiveUI 2011**

3rd International Conference on Automotive User Interfaces and Interactive  
Vehicular Applications, November 29-December 2, 2011, Salzburg, Austria

**Andreas Riener**, Institute for Pervasive Computing, Johannes Kepler University Linz

**Manfred Tscheligi**, ICT&S Center, University of Salzburg

**Myounghoon Jeon**, Sonification Lab, Georgia Institute of Technology

**Joseph Fellner**, AUDIO MOBIL Elektronik GmbH, Austria

## Organizational: **Welcome Address**

### Introduction

- Welcome to AutomotiveUI 2011 in the famous city of Salzburg...
- Must do's/see's in Salzburg
  - taste a Mozartkugel (only the original from "Mirabell"!)
  - visit Mozart birth place and living place
  - stroll around the "Getreidegasse" (beautiful shopping alley)
  - drink a punch and eat roasted almonds/chestnuts at the Christmas Market (Domplatz)
- Short presentation of passive participants / short introductory round before start?
- Write down questions / comments / research challenges / ideas which come up during the presentations (→ Post-it)



### Aim of the workshop

- At the end of the day we would like to have a work program (trends, challenges) in the field of subliminal perception/persuasion for both research and industry

## Organizational: **List of Participants**

### **Attendees**

- 1 Peter Sinclair
- 2 Angela Mahr
- 3 Stefano Damiano Barbati
- 4 Myounghoon Jeon
- 5 Joseph Fellner
- 6 Andreas Riener
- 7 McCall Rod
- 8 Hackenberg Linn
- 9 Erik Borg
- 10 Wybranski Bernhard
- 11 Kluckner Patricia
- 12 Gridling Nicole

## Organizational: **Sensory Modalities**

### Position papers and modalities addressed

	V	A	T	O	G
1 Peter Sinclair		✓			
2 Angela Mahr	✓	✓			
3 Marco Pasetto	✓				
4 Myounghoon Jeon	✓	✓			
5 Joseph Fellner	✓	(✓)	(✓)		
6 Andreas Riener	✓	✓	✓	✓	(✓)

*V... Visual*

*A... Auditory*

*T... Touch, tactile*

*O... Olfactory*

*G... Gustatory*

## Organizational: **Time Plan for the Workshop**

### Schedule

09:00-09:15	Opening and introduction
09:15-11:30	Presentation session 6 presentations (15min. each, accepted position papers see below) Session chair: <i>Andreas Riener</i>
11:30-11:45	Coffee break
11:45-12:35	Group work I (2 parallel groups 40min., short presentations á 5min., discussion round 5min.) Group leaders/presenters: <i>assigned during workshop</i>
11:35-13:25	Group work II (2 parallel groups 40min., short presentations á 5min., discussion round 5min.) Group leaders/presenters: <i>assigned during workshop</i>
13:24-13:40	Closing (wrap-up, ident. of key points, next steps, follow-up Journal Special Issue, conclusion)
13:40-15:15	Joint lunch
afternoon	Poster preparation for the Conference poster session ( <i>Organizers</i> )

Passive participants: Stand up and join in the conversation

## Organizational: **Presentation Session**

### **Presentation order**

- Andreas Riener, "*Information injection below conscious awareness: Potential of sensory channels*", JKU Linz, Austria
  - Peter Sinclair, "*Road Music – Music for your drive from your drive*", ESAA, UAL, University of Newcastle, France
  - Myounghoon Jeon and Bruce Walker, "*In-Vehicle Affect Detection and Mitigation Interfaces: Strategies and Research Questions in Designing Unobtrusive Interactions*", Georgia Institute of Technology, US
  - Angela Mahr, "*From Spearcons towards ‘Semanticons’: Transferring Crossmodal Speech Priming of Visual Objects to the Driving Context*", German Research Center for Artificial Intelligence (DFKI), Germany
  - Joseph Fellner, "*Subliminal Perception in Cars from the Automotive Industry’s Perspective*", AUDIO MOBIL, Ranshofen, Austria
  - Marco Pasetto, "*Experimental investigation on speed control using a driving simulator*", DCT - University of Padua, Italy
- 
- **We invite passive participants to briefly (3-5min.) talk about their research interests in the field of subliminal perception/the reason for attending the workshop**

Organizational: **Coffee Break**



11:30 – 11:45

## Organizational: **Group work I**

### **2 parallel groups**

Peter Sinclair

Hackenberg Linn

Wybranski Bernhard

Joseph Fellner

*(Myounghoon Jeon\*)*

Angela Mahr

McCall Rod

Erik Borg

Stefano Barbatì

Kluckner Patricia

*(Andreas Riener\*)*

### **Organizational**

- *40min.* discussion time; summary on a poster/PPT slide
- *5min.* short presentations by the group (one dedicated person)
- *5min.* joint discussion



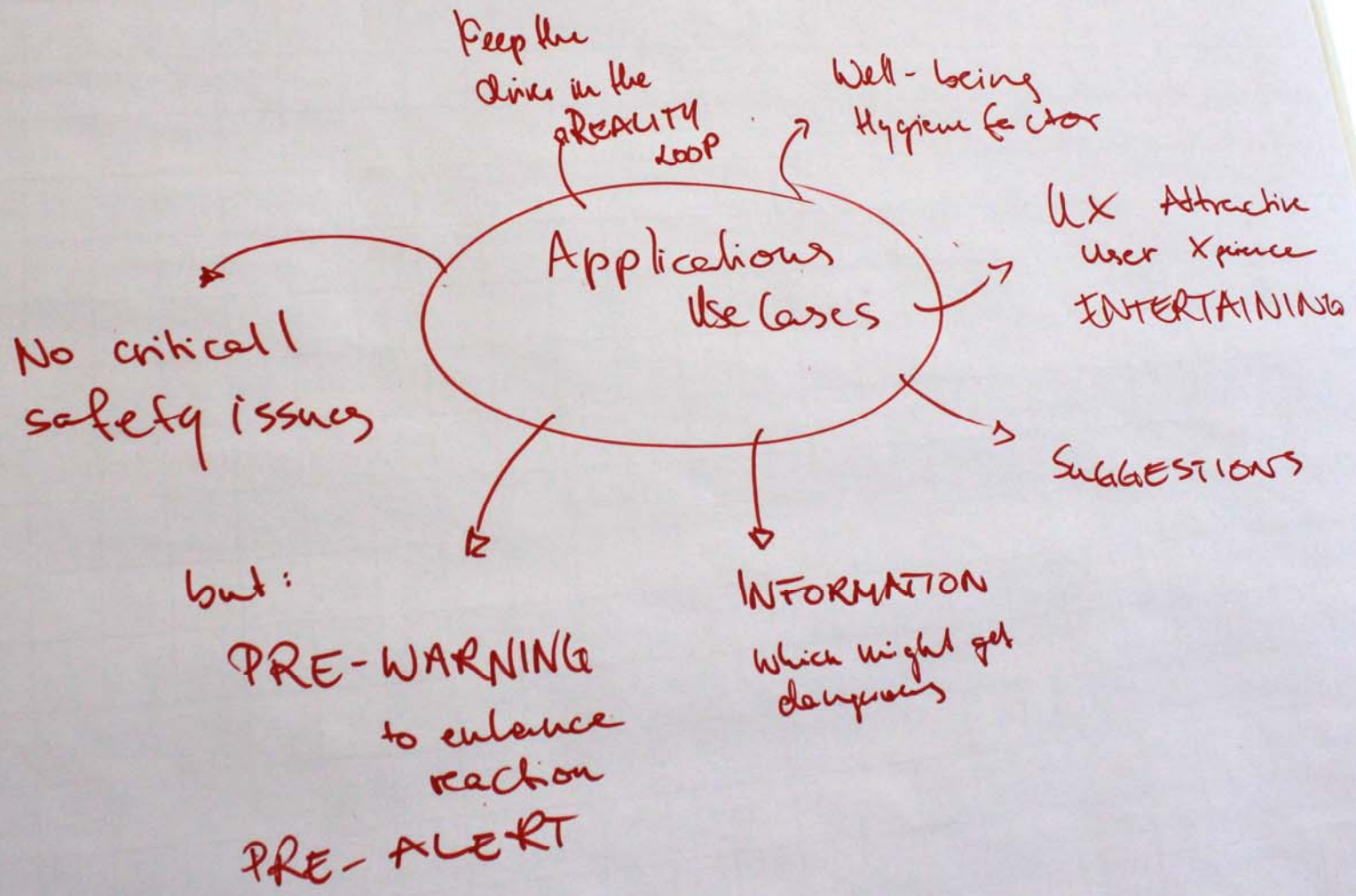
## Organizational: **Group work I**

### **Explore possible application domains in cars**

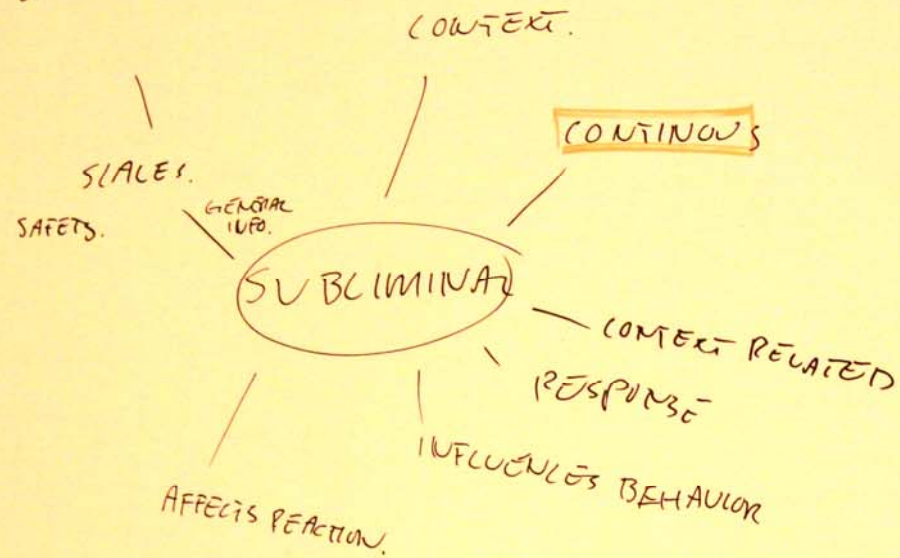
Please discuss and summarize your group's position:

- Why subliminal perception in the car?
  - potential to increase safety and decrease workload and what...?
  - does it add values to driving itself, infotainment/entertainment/human factors such as emotions, fatigue, stress, etc. (or in general primary/secondary/tertiary tasks)?

Def subliminal: Unconscious.  
not recognized (yet)  
not possible to verbalize



u



ONE-DIMENSIONAL



SUBCLIMINAL IN A CAR CONTEXT.

YES, WE HAVE WE CAN CONVEY INFO WITH LESS COST. MENTAL COST.

## Group Work I (Definition, Principles, Theory): **Lessons learned**

- Question: What is subliminal (definition required before discussion)?
  - > unconscious, not recognized, not possible to verbalize
  - > can we differentiate levels of subliminal stimuli?
- Example of subliminal perception in the car
  - > the moment you seat down on the seat you feel the contact with the chair; if everything is ok/perfect (temperature, seat cushion, etc.) you stop thinking about the seat; you perceive it further only subliminally as long as there is no critical aspect emerging...
- Subliminal perception/effects is/are extremely difficult to documentate, to test, to repeat...
- The border between conscious and un-(sub-)consciousness is very vague...
  - > large spectrum, continuum, ...
- Subliminal effects in a real driving situation are always different to a lab situation
  - > test on subliminality should include driving in the wild!

## Organizational: **Group work II**

### **2 parallel groups (composition changed!)**

Angela Mahr  
Hackenberg Linn  
Wybranski Bernhard  
Joseph Fellner  
Stefano Barbati

*(Myounghoon Jeon\*)*

Peter Sinclair  
McCall Rod  
Erik Borg  
Kluckner Patricia

*(Andreas Riener\*)*

### **Organizational**

- *40min.* discussion time; summary on a poster/PPT slide
- *5min.* short presentations by the group (one dedicated person)
- *5min.* joint discussion

## Organizational: **Group work II**

### Design a novel interface/application based on / using subliminal perception

Please discuss and summarize your group's position:

- Title
- Goal/mission statement
- Modalities (I/O)
  - using technologies available within 5-7 years
- Who/what situation/When
  - e.g. restriction in time of use (day, night), situation (highway driving, city traffic, in a traffic jam)

# Effortless ECO

visual - ambient lighting  
- green & brown grass plants

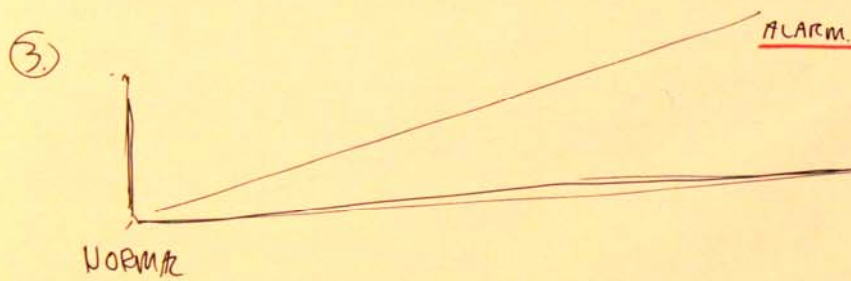
auditory - speed up / more fast  
environmental noise ↑ + music ↓  
- drive ecologically  
↳ silence / music

tactile <sup>fragrance</sup> seat vibrations (speed ↑) → ↑  
not fixed ↓ → soft / hard  
↑ tiny movement  
tightens & "embraces"  
kick-down feedback (4/3/2/1/-)

olfactory • good smell for ecological driving  
"fresh air"  
• punishment ↓



② ATTENTION IS GOING DOWN.  
 - COGNITIVE UNDERLOAD.



④ BACK GROUND COGNITIVE STIMULATION.

~~WAKES U UP~~

SHAKE'S YOU UP WITHOUT BEING  
 TO PUSH

- SOUND
- TACTILE



## Group Work II (Novel Applications based on Subliminals): **Lessons learned**

- Group 1 - "Effortless ECO"
  - > **visual:** ambient lighting (light changes from red to green) / if driving ecologically plants get green (environment looks nicer...)
  - > **auditory:** if driving unecologically environmental noise becomes louder and music fades out (disturbing the driver)
  - > **tactile:** kick-down feedback (e-vehicles) // seat vibrations (speed, frequency) inflating seat to adapt the driving behavior (from soft to hard) // seat moves front and back
  - > **olfactory:** "good smell" for ecologic driving; what for punishment?
  
- Group 2 – "Shake you up without being to push"
  - when driving on a straight road for a long time (highway) attention is expected to go down → cognitive underload (how to detect, react on), "coffee required to wake up..."
  - how to stimulate your cognition?
  - gradually increasing transition from unconscious to conscious...

## Organizational: **Closing**

### **Wrap-up**

- Identification of key points
  - from group discussions (posters)
  - automotive industry perspective
  
- Issues/ideas brought up during the workshop will be further discussed after the event → post-conference conclusive paper...
  - email list, Wiki on the workshop web page to facilitate continuing activities
  - follow-up workshop planned for
    - > general HCI related conference
    - > AutomotiveUI 2012
  
- Publication of workshop contributions (papers)
  - propose a special issue (MIT Presence, etc.), invite participants to submit extended versions of the papers in the follow-up journal special issue
  
- Conclusive remarks: thanks to reviewers...

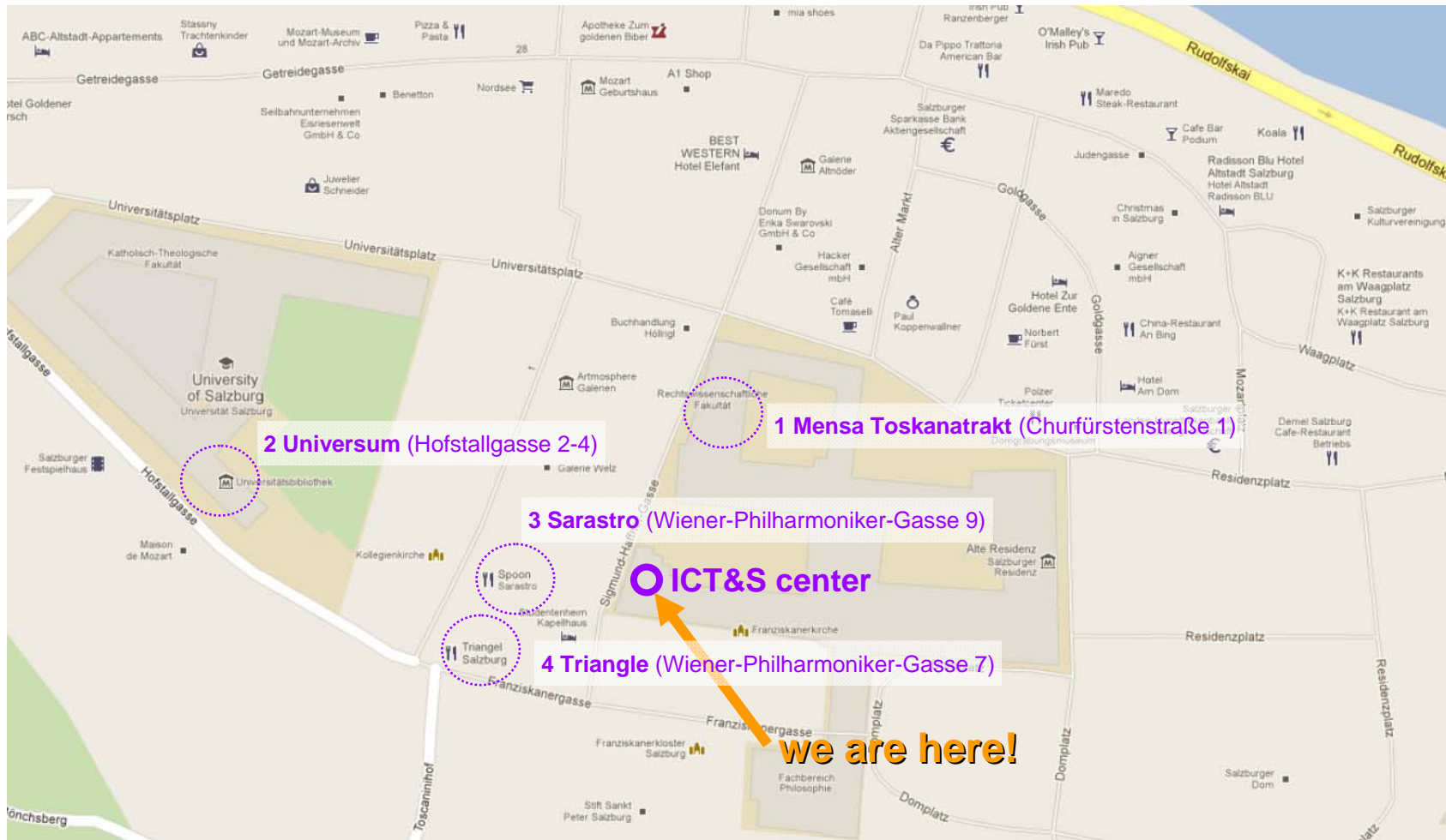
## Organizational: **Closing**

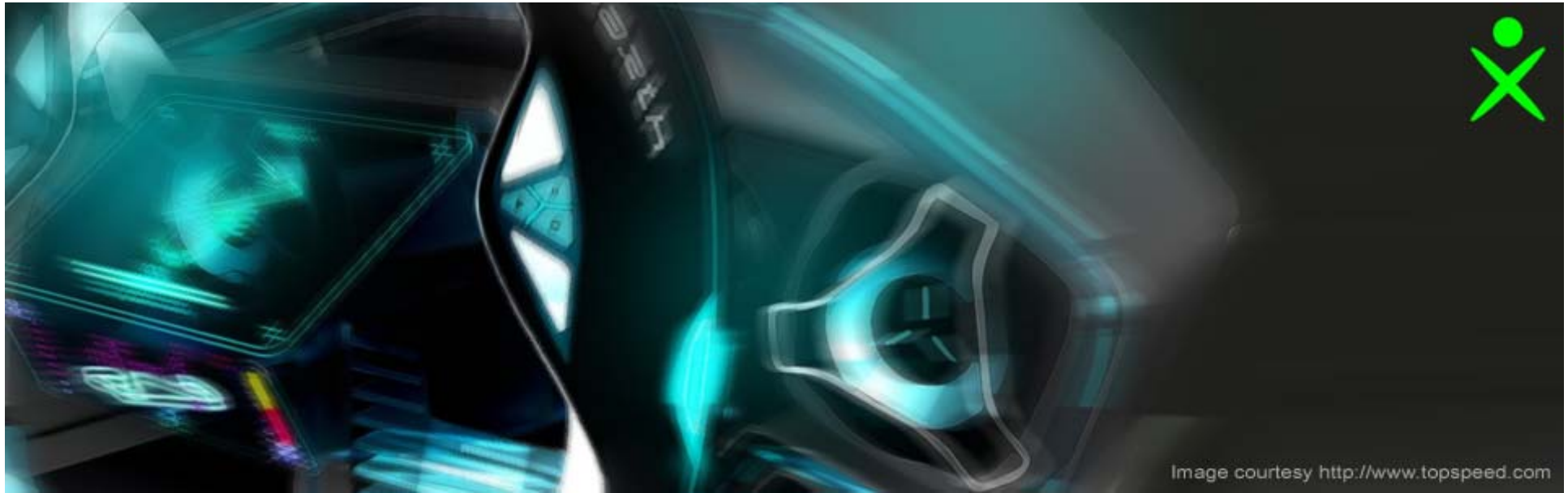
### **Thanks to all the Reviewers/TPC**

- Miriam Reiner, Technion, Israel Institute of Technology, Israel
- Bruce Walker, Georgia Tech, USA
- Michael Nees, Lafayette College, USA
- Pierre Chalfoun, University Of Montreal, Canada
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- Marc Kurz, University of Linz, Austria
- Dagmar Kern, Bertrandt AG, Germany
- Christina Dicke, Relevantive AG, Germany
- Joseph Fellner, AUDIO MOBIL Elektronik GmbH, Austria

# Organizational: Hungry?

Last but not least... lunch options





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