

Advanced Graphics and Interaction 2015: Lecture 1



SolarSense, ÅGI13.

Mario Romero
2015/08/31



VICSTHLM
VISUALISATION INTERACTION COLLABORATION

AGI15 Calendar: link

- Mon 31 aug 15:00-17:00 Lecture 1 – Introduction
- Tue 1 sep 13:00-17:00 Lecture 2-3: Forming Groups and Brainstorming
- Mon 7 sep 15:00-17:00 Lecture 4: Proposals
- Thu 10 sep 10:00-12:00 Lecture 5: Discussion based on Proposals
- Mon 14 sep 15:00-17:00 Lecture 6: Hello World Demos
- Thu 17 sep 10:00-12:00 Lecture 7: Discussion based on the Hello World Demos
- Tue 22 sep 10:00-12:00 Lecture 8: Preparing ForskarFredag 2015
- Fri 25 sep 8:00-16:00 ForskarFredag
- Mon 28 sep 15:00-17:00 Lecture 9: Reflecting on ForskarFredag
- Mon 5 oct 15:00-17:00 Lecture 10: Agile Development 1 towards Comic Con - Gamex 2015
- Mon 12 oct 15:00-17:00 Lecture 11: Agile Development 2 towards Comic Con - Gamex 2015
- Fri 30 oct 9:00 – Sun 1 Nov 16:00 Comic Con Gamex
- Mon 2 nov 15:00-17:00 Lecture 12: Reflecting on Comic Con Gamex
- Tue 3 nov 13:00-17:00 Lecture 13-14: Forming new groups and brainstorming project 2
- Tue 10 nov 10:00-12:00 Lecture 15: Proposals Project 2
- Tue 17 nov 10:00-12:00 Lecture 16: Hello World Demos for Project 2
- Tue 24 nov 10:00-12:00 Lecture 17: Agile Development 1 for Open House
- Tue 1 dec 10:00-12:00 Lecture 18: Agile Development 2 for Open House
- Fri 4 dec 15:00-19:00 VIC AGI15 Open House

Case: Uniview

How it works?

- Real-time rendering
- Depth sorting
- Scalegraph
- Texture map

Improvements

- Earth scale objects
 - Dynamics
- VR + gestures
- Hololens AR



Agenda

1. Introduce VIC / Uniview
2. Show past AGI
3. Introduce AGI15
4. At 17:00 introduce myself
5. Next time...

Advanced Graphics and Interaction

The Students



Students in Advanced Graphics and Interaction 2012 (AGI12) in ForskarFredag

Andreas

Niklas

Eric



Johan

Robert

Joakim

Emil

André

Elvira

Jonas

It's all about the students



Students in Advanced Graphics and Interaction 2013 (AGI13) in the Visualization Studio VIC

It's all about the students

EXPERIENCE ADVANCED
GRAPHICS & INTERACTION

House

PODRACER



Students in Advanced Graphics and Interaction 2014 (AGI14) in the Visualization Studio VIC

The Team 2015



Björn Thuresson
VIC director

Coordinate
Projects
Events
thure@kth.se



Henrik Edlund
VIC Engineer

Technical Support
Ideation
Critical Feedback
henedl@kth.se



Gregorio Palmas
Teaching Assistant

Logistics
Technical Support
Critical Feedback
gpalmas@kth.se



Mario Romero
AGI15 Coach

Guidance
Focus
Support
marior@kth.se

Contact Mario

- Office:
 - Lindstedtsvägen 5 – 4417
- marior@kth.se
- Mobile (txt or call) 076 258 1802
- www.kth.se/profile/marior/
- www.facebook.com/marioromero73
- twitter.com/MarioRomero73
- www.linkedin.com/in/marioromero

The Studio

Resources: Visualization Studio

- Research
 - Visualization Supported Collaborative Work
 - Foundational Technology
 - User Evaluations
- Showcase and classroom environment
- Outreach



Technologies in

VICSTHLM
VISUALISATION INTERACTION COLLABORATION



2015/08/31



AGI15 - L1

- High-resolution projection wall with stereoscopy
- Oculus Rift
- Cinema quality 7.1 audio
- High-definition video communications with eye contact
- Holographic display
- Multi-touch interactive surfaces
- Eye tracking
- GPU-based computing cluster
- Game controllers
- Tablets
- Cameras
- Haptic Devices
- 3D printer
- AR HUDs

Visualization Pipeline

expanded from Readings in Information Visualization: Using Vision to Think
By Stuart K. Card, Jock D. Mackinlay, Ben Shneiderman, 1999



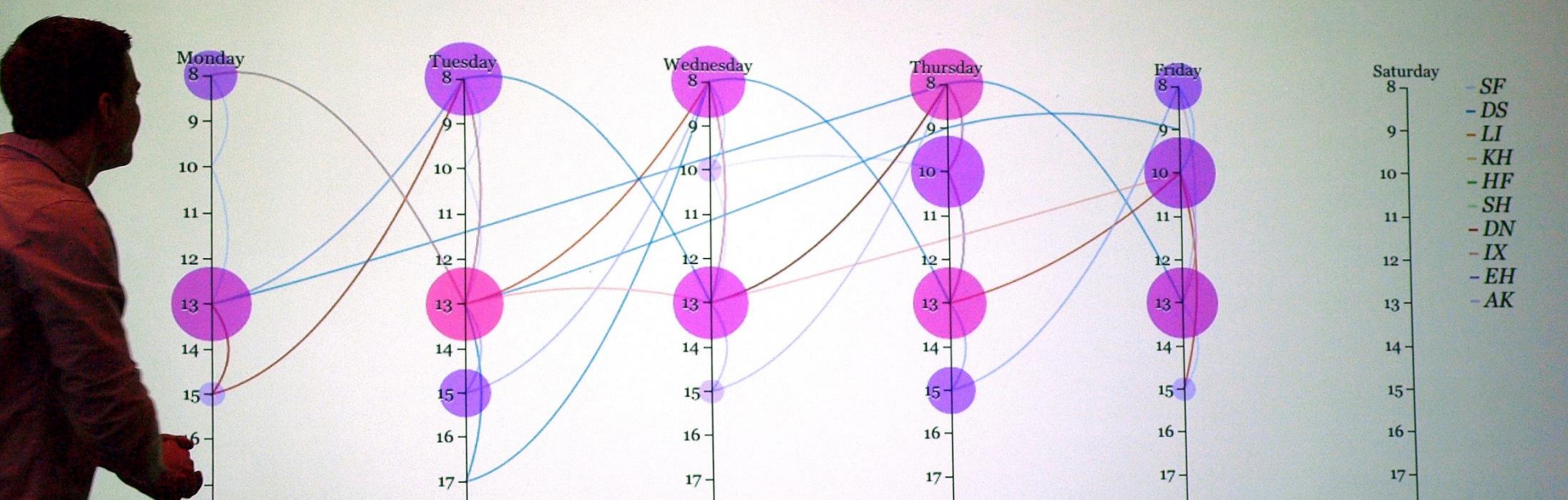


The Learning



IVIS14 final demo in VIC

Students teaching themselves and each other.



IVIS13 final demo in VIC

Students teaching themselves and each other.



VIS14 final demo in VIC

Students teaching themselves and each other.



IVIS14 final demo in VIC

Students teaching themselves and each other.



IVIS14 students @ C-Awards

Students presenting to the open public.



AGI12 students @ FF

Students presenting to the open public.



AGI13 students @ GAMEX

Students presenting to the open public.



AGI14 students @ Comic Con - GAMEX

Students presenting to the open public.



AGI13 students @ GAMEX

Students presenting to the open public.

The Seed



SIGGRAPH2012

The **39th** International **Conference** and **Exhibition**
on **Computer Graphics** and **Interactive Techniques**

Conference 5–9 August 2012
Exhibition 7–9 August 2012
Los Angeles Convention Center

Technical Papers

P R E V I E W

Assignment 1 (60 – 100 minutes)

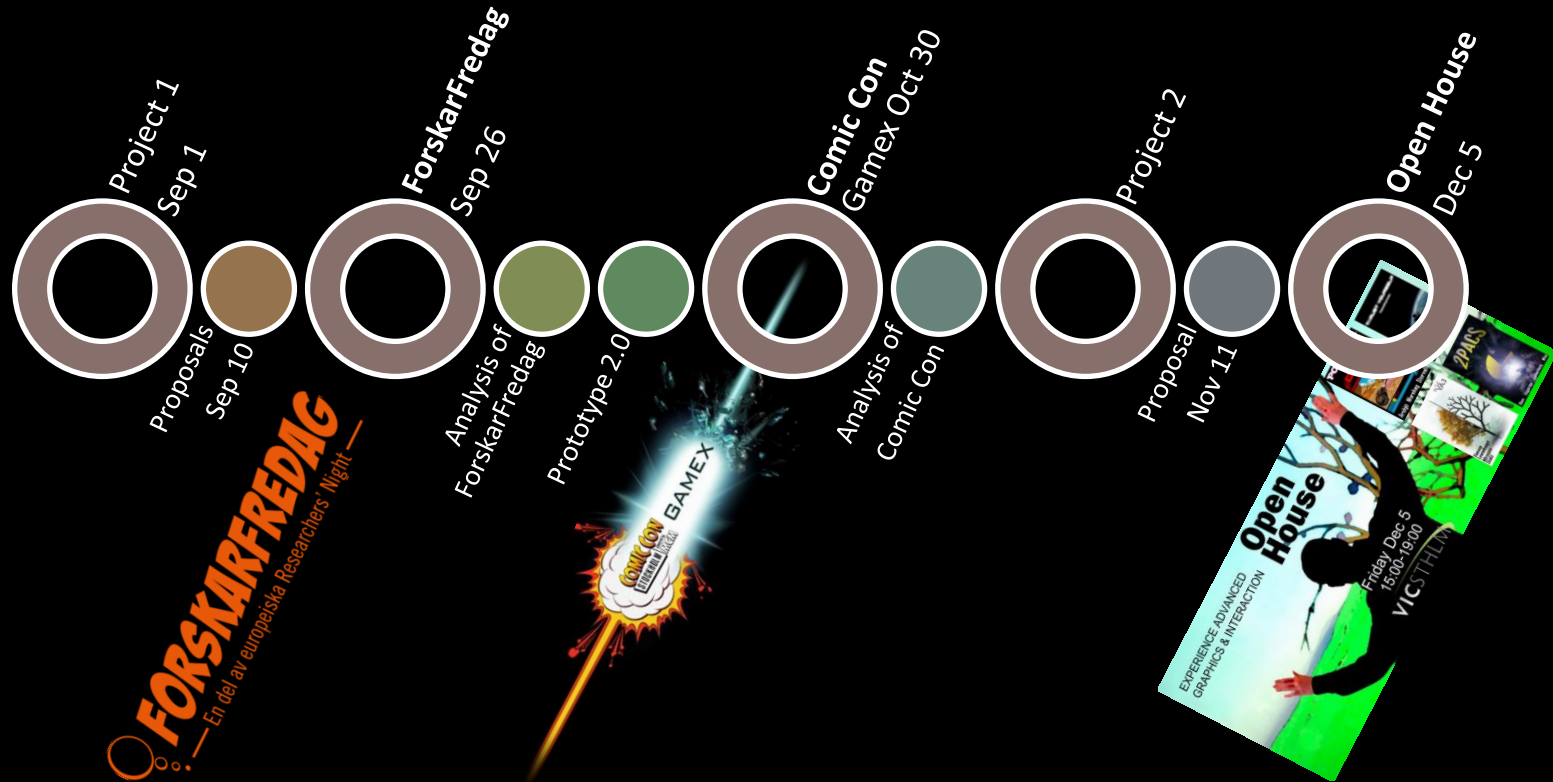
Tuesday September 1 at 13:00

1. Answer this [Survey](#)
2. Watch these videos and answer this [survey](#):
 1. [2012 SIGGRAPH Technical Papers](#)
 2. [2012 SIGGRAPH Emerging Technologies](#)
 3. [2013 SIGGRAPH Technical Papers](#)
 4. [2013 SIGGRAPH Emerging Technologies](#)
 5. [2014 SIGGRAPH Technical Papers](#)
 6. [2014 SIGGRAPH Emerging Technologies](#)
 7. [2015 SIGGRAPH Technical Papers](#)
 8. [2015 SIGGRAPH Emerging Technologies](#)
3. Familiarize yourself:
 1. [KTH Social](#)
 2. [Facebook](#)
4. Think of what you would like to build in AGI15

The Challenge

Advanced(Graphic + Interaction) = Project

Timeline





FORSKARFREDAG

— En del av europeiska Researchers' Night —



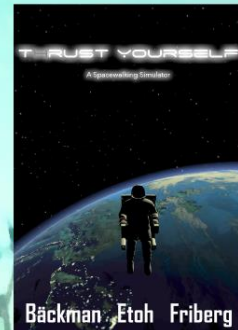
COLLIDING WORLDS
FRIENDS ARENA 30 OKT - 1 NOV 2015

EXPERIENCE ADVANCED
GRAPHICS & INTERACTION

Open House

Friday Dec 5
15:00-19:00

VICSTHLM



Select Portfolio

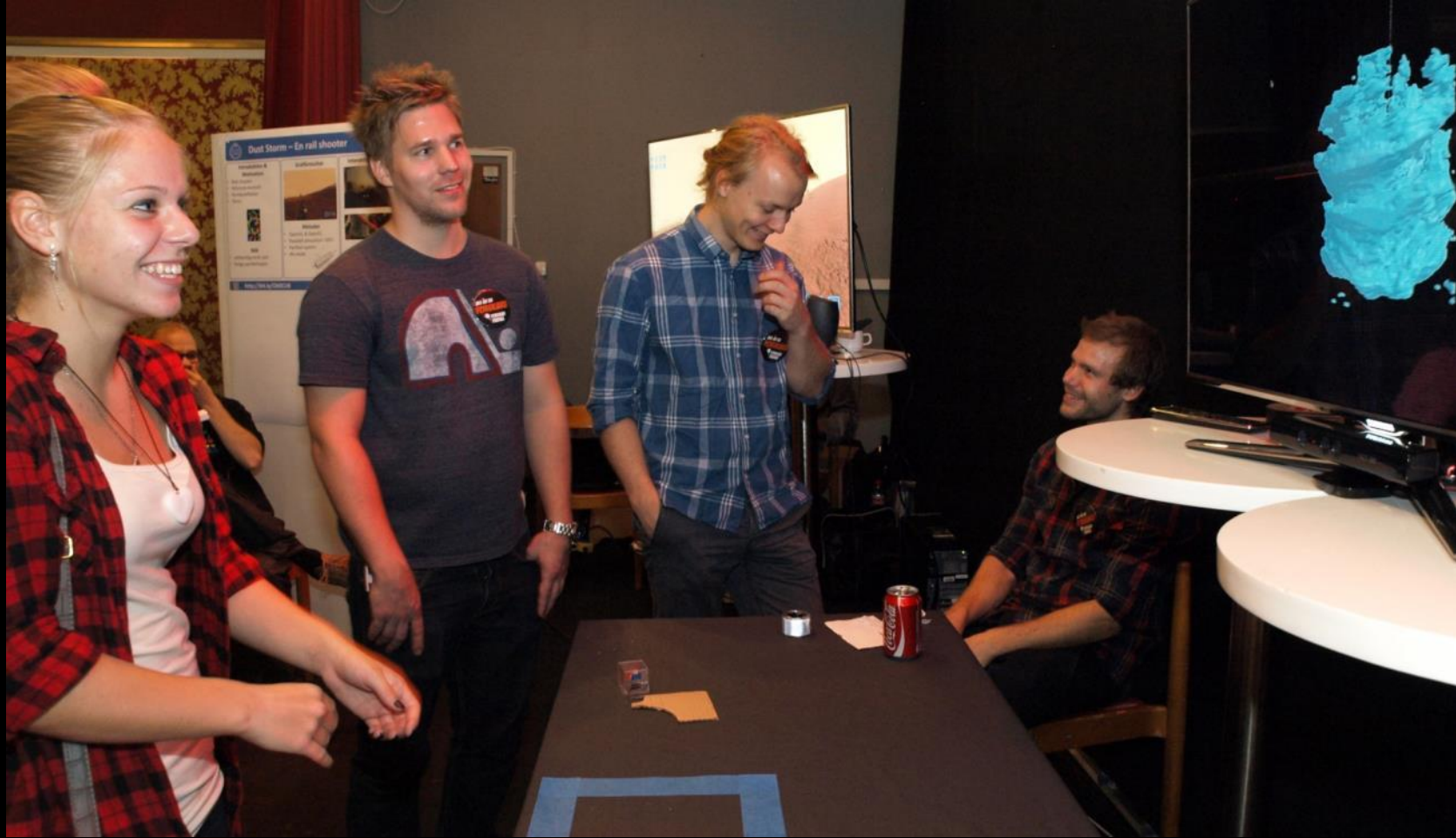
AGI12

Virtual Sculpting

- Volume Rendering
- Computer vision interaction







Dust Storm

- Particle Systems
- Accelerometer-based gesture control



Base Jumper

- Octree rendering
- Computer vision body control



AGI13

SolarSense

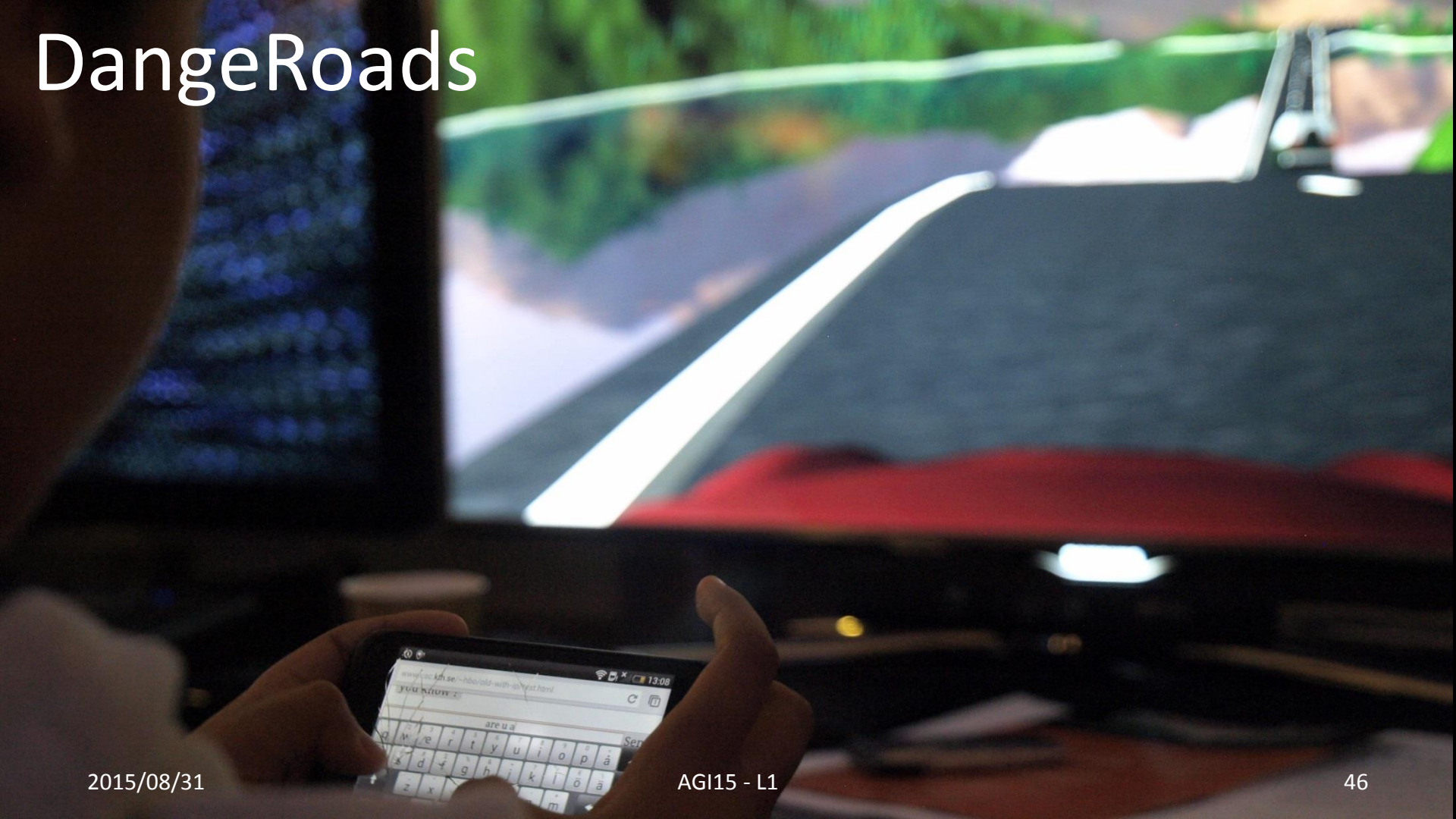


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AGI15 - L1

45

DangeRoads



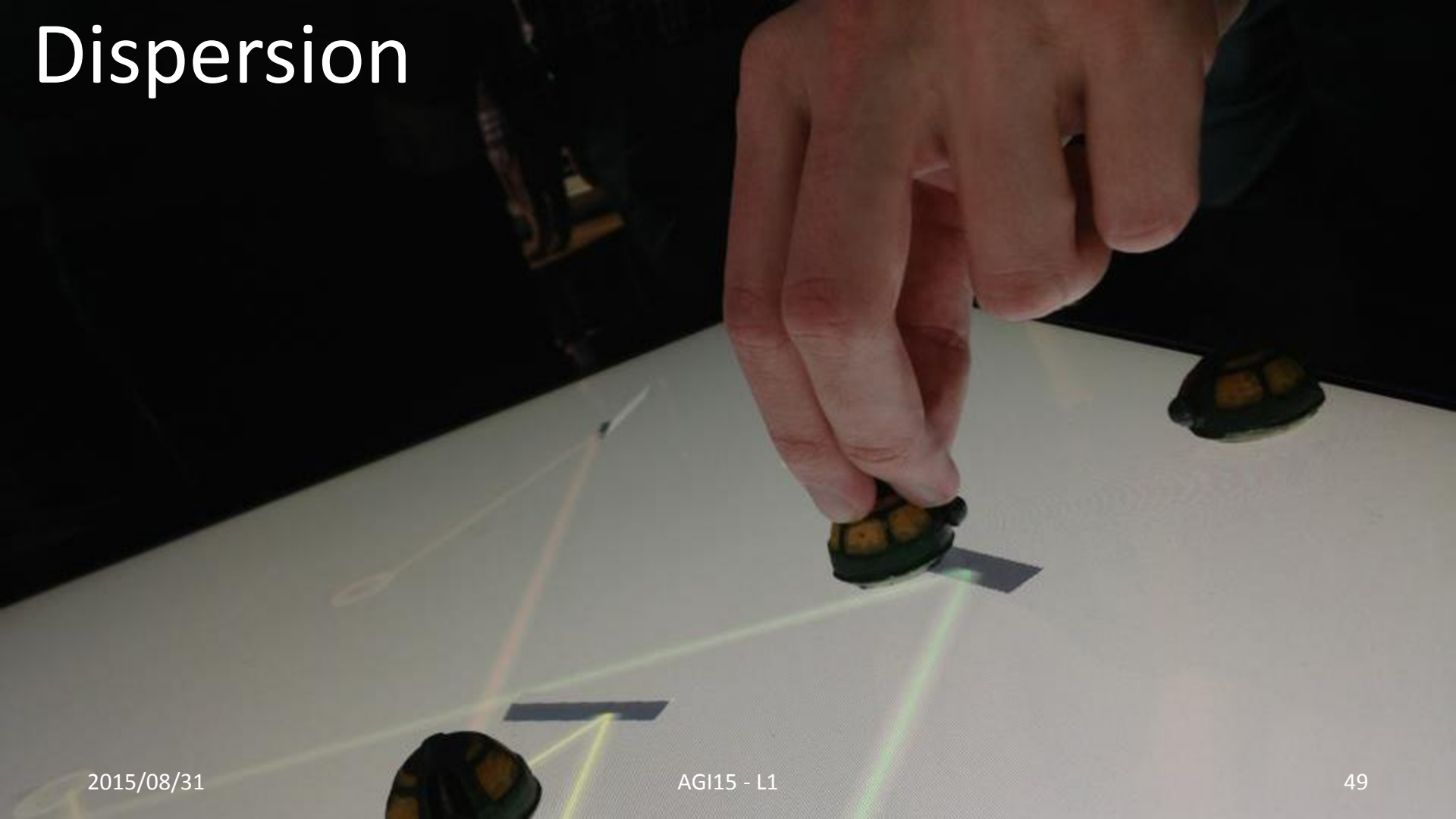
FaceUp



Composit



Dispersion



AGI14: tomorrow

IMPACT



"För alla som varit galet förälskade" Johan Norberg, idéhistoriker & författare

+8°C 12m/s Malmö



Följ Metro f t

Start > Nyheter Pryn Senaste nytt Sverige Världen In English

UPPDATERAD : 1 dag 08:42 PUBLICERAD : 1 går 23:17

De utvecklar spel för säkrare vägar

Den 1 december börjar nya regler gälla för mobilanvändning vid ratten. Och i samband med det utvecklar studenter vid KTH och Bergshs i Stockholm ett spel som ska avskräcka förare från att köra bil och sms:a samtidigt.

Rekommendera 14 Tweeta 3 +1 0



Stina Ekholm visar och Cedric Mrin, Yann Chazallon, Remi Blateron och Henrik Boström tittar på. Foto: Urban Brådhe

Spelet går enligt studenterna ut på att uppmärksamma på farorna man utsätter sig själv och andra för när man använder telefonen bakom ratten

MEST LÄST



- 1 Tryckte falska tusenlappar i mangelrum
- 2 Hårda hot mot Jimmie Åkesson i ny låt
- 3 27 djur dog under Hobbit-inspelning

ANNONS KOMMENTERAT



- 1 Lisa Magnusson: Sverigedemokraterna är fortfarande rasister
- 2 Hårda hot mot Jimmie Åkesson i ny låt

SENASTE NYTT

- 10:43 Malmberg prisas för bok om Blake
- 10:42 Flygplan i diket på Arlanda
- 10:42 Nya stjärnor söker schlagerrevansch
- 10:41 Vietnam inför hårdare Facebookregler
- 10:38 Saknad man var misstänkt för dubbelmord

Visa fler...

SÖK

Sök på metro.se



Metro Sverige

Like

11,423 people like Metro Sverige.



Facebook social plugin

Tweets

Följ

Welcome to AGI15

- Intended Learning Outcomes:
 1. Collaborate to build original and stable projects that combine methods in advanced computer graphics and advanced human-computer interaction;
 2. Communicate the theory and practice of these methods at a technical and a practical level;
 3. Provide informed constructive criticism to the development of the projects from other teams;
 4. Demonstrate the projects at large public venues to open audiences.

AGI14 Grade Assignment

- Project 1 50%
- Project 2 40%
- Assignments 10%
 - < 100 minutes/week
 - Reading
 - Writing
 - Coding
 - Interacting

Project 1 (50%)

- Proposal 5% 7/9
- Demo 5% 14/9
- Forskar Fredag 10% 25/9
- Deliverable 1 5% 23/10
- Comic Con 10% 30/10
- Open House KTH 10% 4/12
- Deliverable 2 5% 11/12

Project 2

- Proposal 5% 10/11
- Demo 10% 1/12
- Open House KTH 15% 4/12
- Deliverable 10% 11/12

Deliverables

- Working VIC Demo
- Code with good comments
- Webpage
 - Description
 - Photos
 - “Making of” documentary (2 minutes)
 - Demo Reel (30 seconds)
 - PR Material: logo, trailer, flyers, posters, catalog...
 - User Testimonials

Assignment 1 (60 – 100 minutes)

Tuesday September 1 at 13:00

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 7. [2015 SIGGRAPH Technical Papers](#)
 8. [2015 SIGGRAPH Emerging Technologies](#)
3. Familiarize yourself:
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 2. [Facebook](#)
4. Think of what you would like to build in AGI15

Next Class

- Tomorrow, Tuesday Sept 1
 - 13:00 – 17:00
- AGI14 projects
- Form groups
- Brainstorm
- Discuss
- Propose drafts

 [groups/agi15](https://www.facebook.com/groups/agi15)



Further Reading

PRIMO

Primo på svenska

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KTHB Primo

"Fundamentals of Computer Graphics"



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Source

Subject

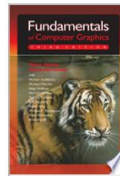
Author/Creator

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2 Results

Sorted by: Relevance ▾



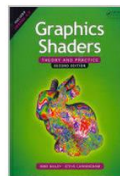
Book

Fundamentals of computer graphics

Peter Shirley Michael Ashikhmin; Stephen Robert Marschner
2009

Online

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Book

Graphics Shaders: Theory and Practice, Second Edition

Bailey, Michael ; Cunningham, Steve
2011 2nd ed.

Online

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[Volume 12 Issue 2](#)
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Thank you!
Questions

marior@kth.se

Advanced Graphics and Interaction

High-Quality Ambient Occlusion
Volumetric Light Scattering
Shadow Maps
Multi-Texturing Techniques
Cloth simulation
Soft Bodies
Fluids
Smoke
Rigged body animation
Rigid Body simulation
Multiple specular reflections and refractions
Shading techniques
N-body simulation
Generating Complex Procedural Terrains
Animated Crowd Rendering
Collision detection
Hair
Snow

Clouds
Geometric texturing
Voxels - texturing - modeling - animation
Octree rendering
Volumetric shadows
GPU Ray Tracing of large scenes with shadows, reflections and ambient occlusion

...

Virtual Reality
Augmented Reality
See-through HUDs
Embodiment
Kinect
Wii mote
Multi platforms
4k screen - touch
Haptics
Mobile interaction
3D printing
Microsoft surface
Pixelsense
Touch screens
Gestures
Accelerometers
On-body sensing
Sonification
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