
Fremtidens Byggeri
GSV
Mennesker før maskiner


Partner
Jacob Strømann Andersen
Henning Larsen
GSV
Mennesker før maskiner

Henning Larsen

Design med viden

Fremtidens øjne på fremtidens byggeri

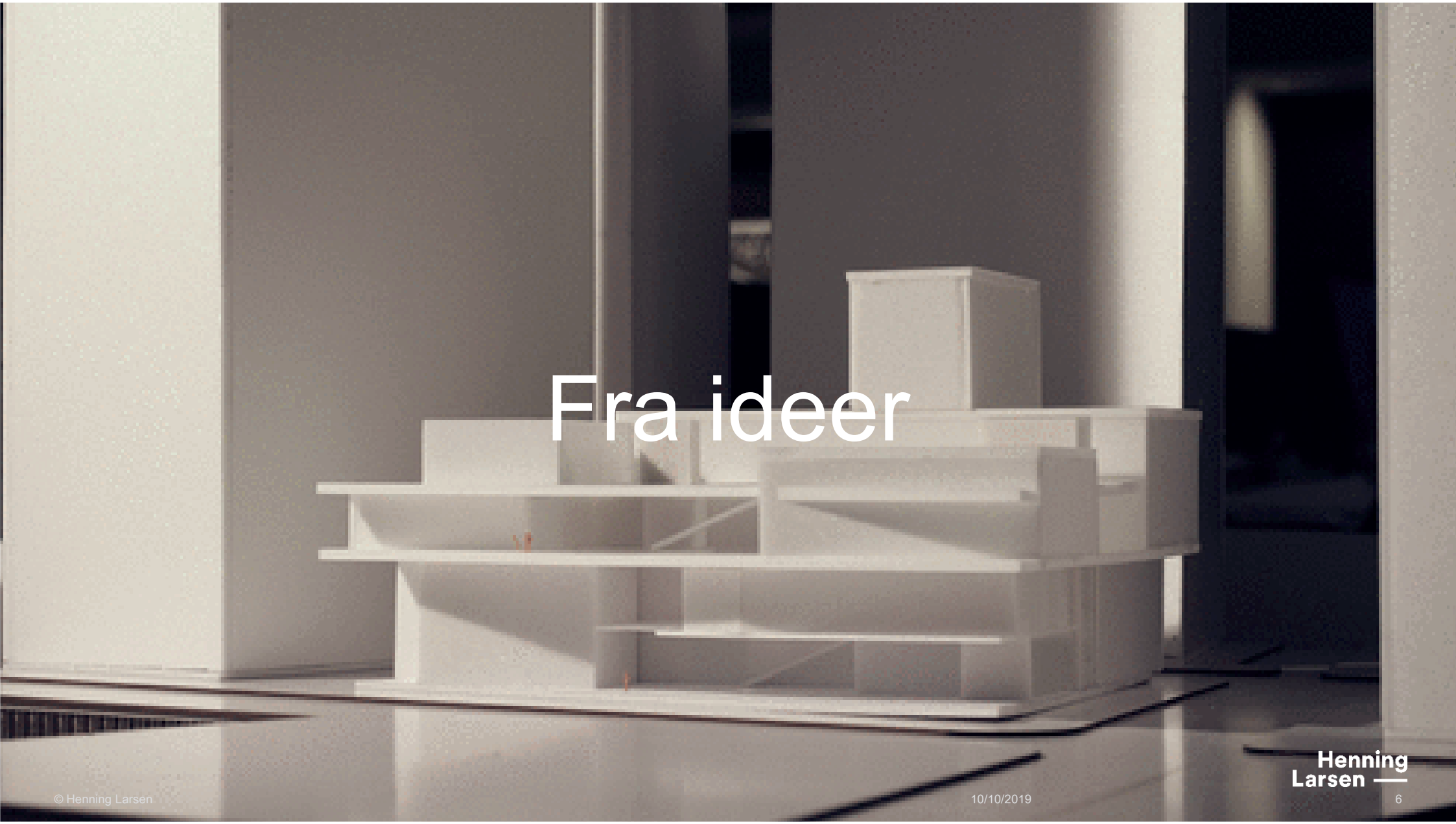
GSV
Mennesker før maskiner

Jakob Strømann-Andersen

Partner, Head of Sustainability Engineering

PhD, MSc. Arch. Eng.

DGNB Auditor, LEED AP, WELL AP



By 2050, 68% of the world’s population will live in cities.

Source: UN Department of Economic and Social Affairs

A Time of Complex Challenges

Hurricane Harvey, Port Arthur, TX, USA

Washington, US

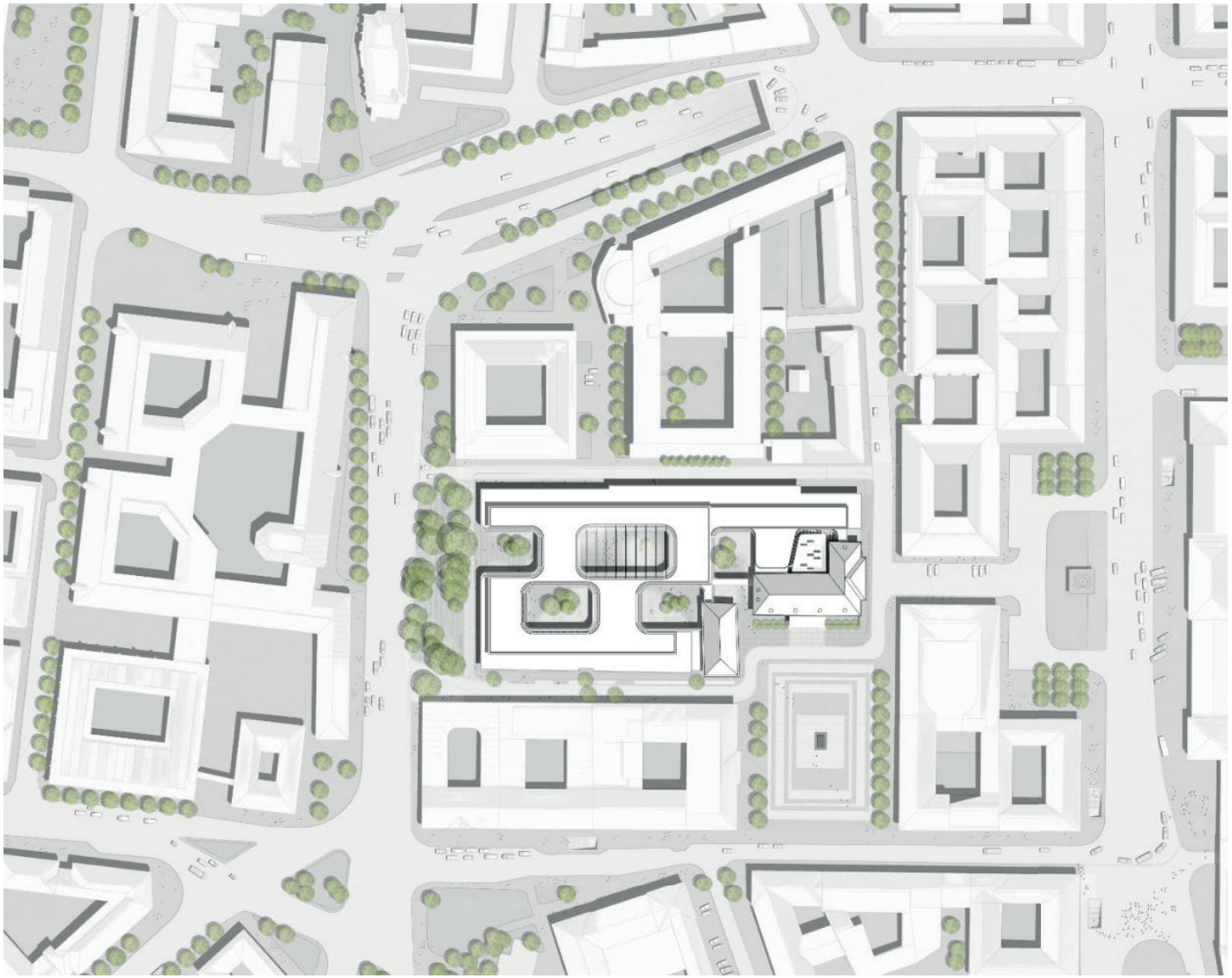
Munich, Germany

Siemens Global HQ

Identity
Historic link to Munich

Visibility
Sustainable frontrunner
in an urban context

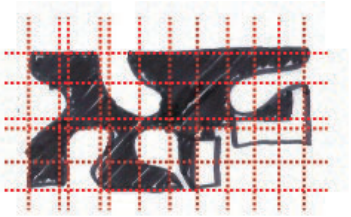
Urbanity
Modern and attractive
work place



Woven into the urban fabric

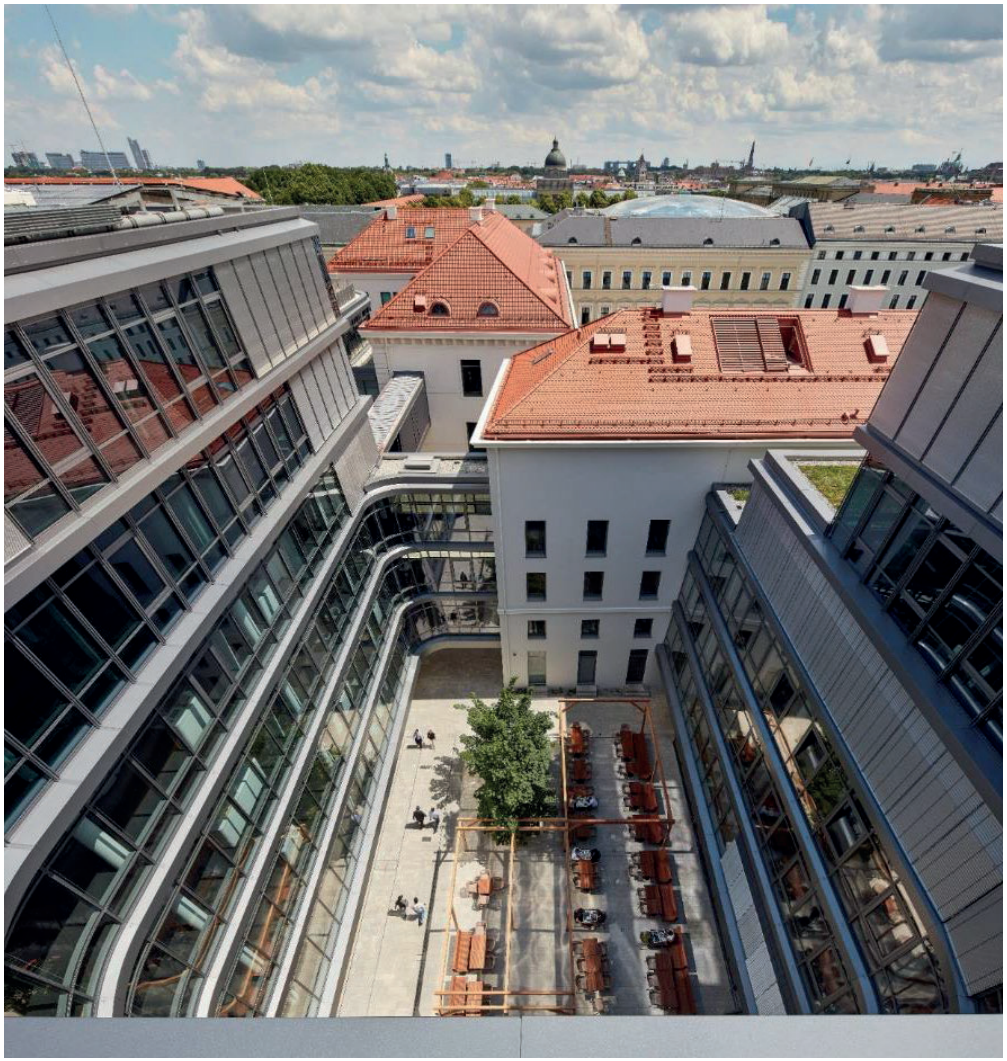
The site

Inviting the public in



Structural optimization

A series of green court yards



3 different façade strategies

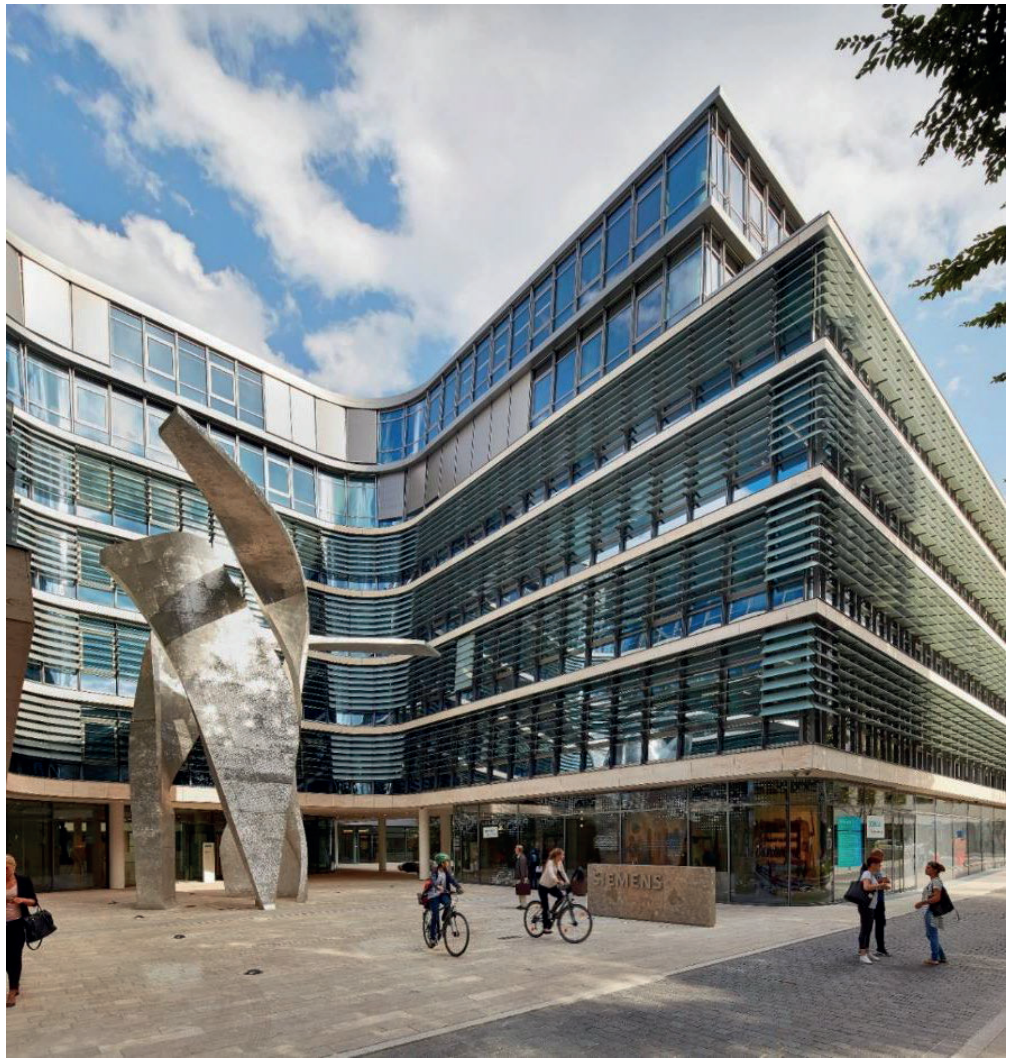
1: Discreet towards the protected Ludwig Ferdinand Palais

3 different façade strategies

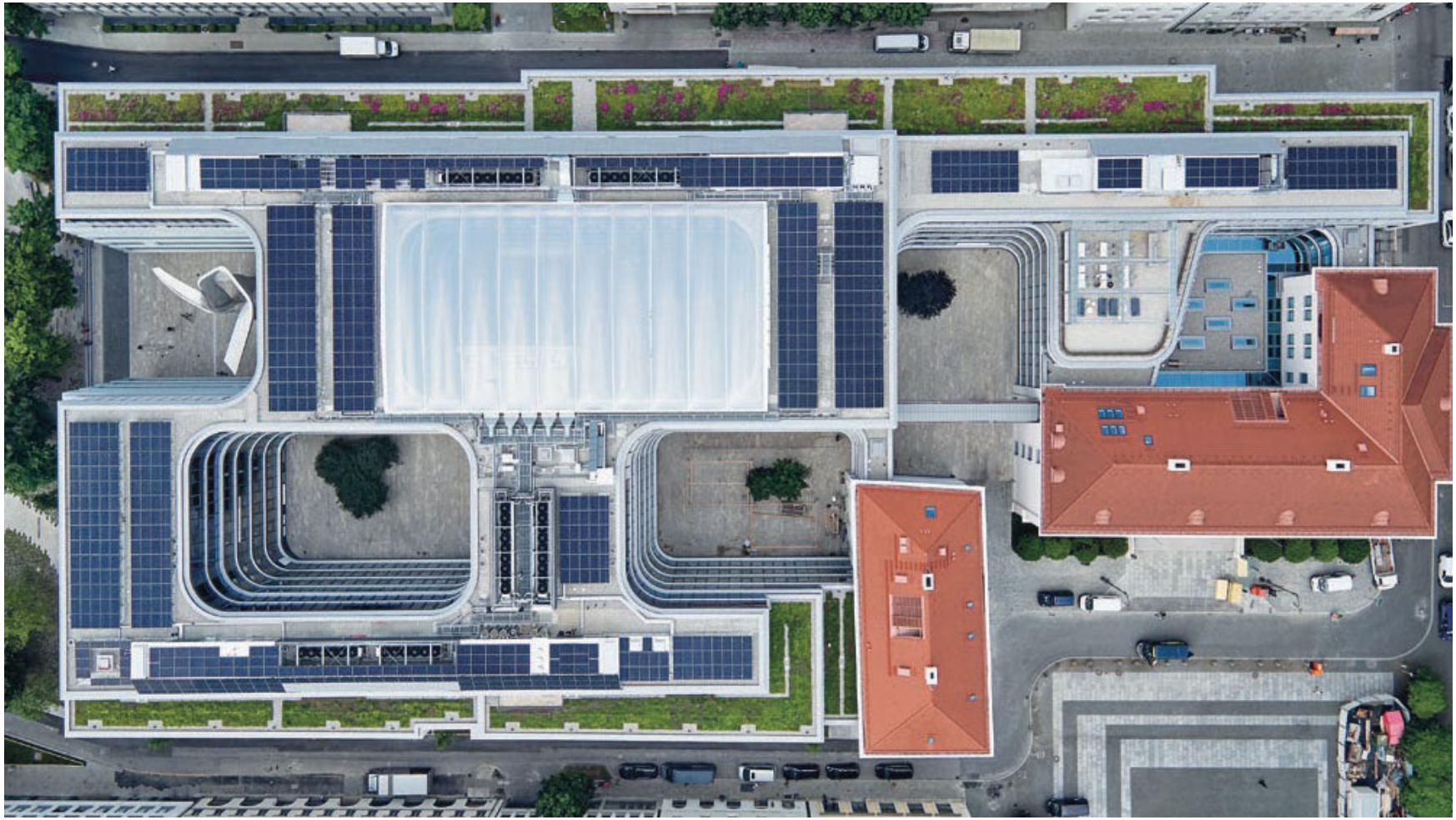
2: Elegant and adaptable towards neighbour buildings

3 different façade strategies

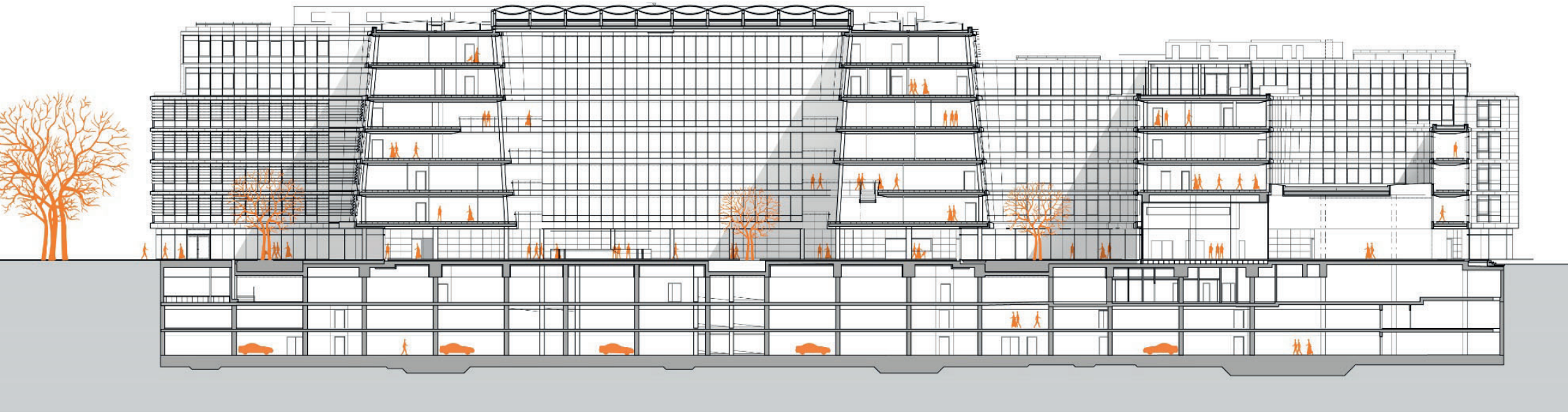
3: Significant and modern towards the heavy traffic



Sustainable by design
Solar Power Generation by Photovoltaic Roof System



Sustainable by design
Tilted inner faced for inflow of daylight



A social contribution to the city


Henning Larsen
INPUT
De spørgsmål vi stiller
Drømme
Visioner
(Effekt)mål
Fælles fortælling
Data
Målinger
Arkitektur
IMPACT
Den effekt vi skaber
Effekten på brugerne
Effekten på byen/samfundet
Effekten på miljøet/naturen

© Henning Larsen


KENYA
UGANDA
RIPLIMO
ERITREA
KIFLE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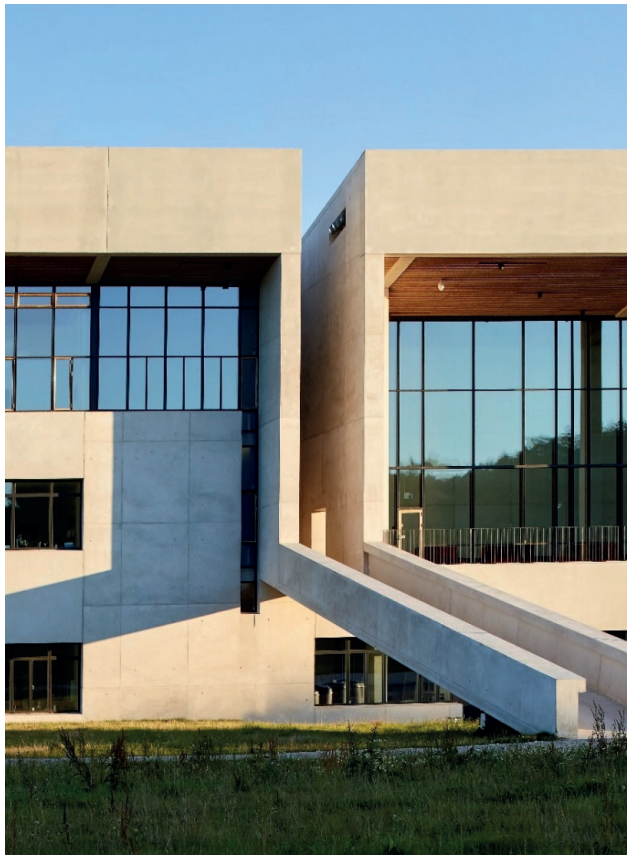


Projects

Design methods

Energy and Buildings

The urban canyon and building energy use: Urban density versus daylight and passive solar gains

J. Strømann-Andersen, P.A. Sattrup

Research

Hvorfor forsker vi?

Henning Larsen

Fordi vi leder efter løsninger, der kan kvalificere vores arkitektur og skabe højest muligt næringsindhold for brugerne i vores bygninger og byer.

Henning Larsen

Det handler ikke om, hvordan bygninger og bymiljøer ser ud, men hvad de kan

Forskning

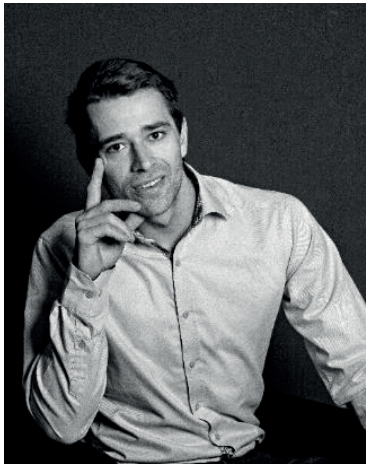
In-house Industrial PhDs Programs

Imke Wies van Mils

PhD. Stud. Artificial Lighting

Pelle Munch-Petersen

PhD. Stud. Facade Design, Architects



Krister Jens

PhD. Stud. Big Data

Drew Thilmany

Phd. Stud. Ethnology, MA Applied Cultural Analysis

Finnur Pind

Phd. Stud. Acoustics, MSc. Civil Engineer

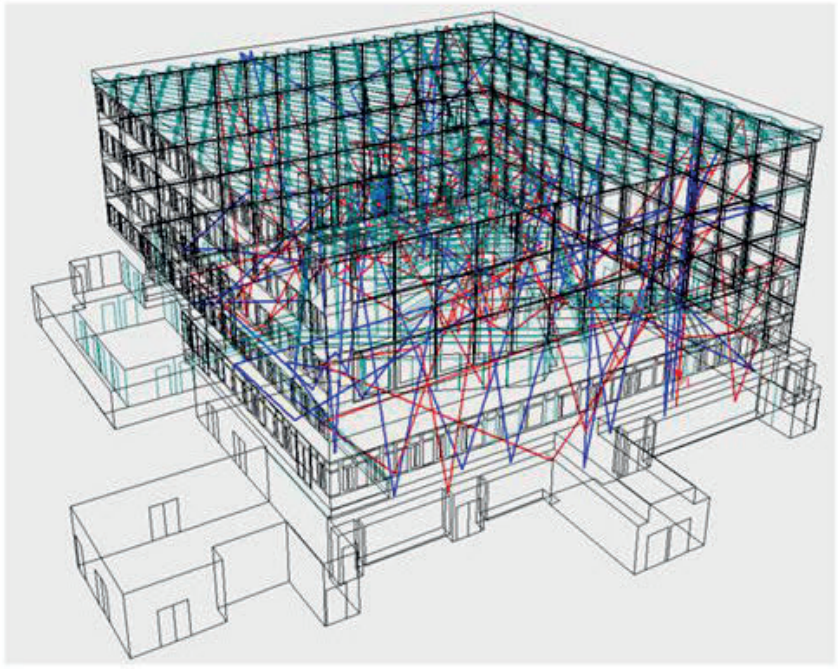
Cases

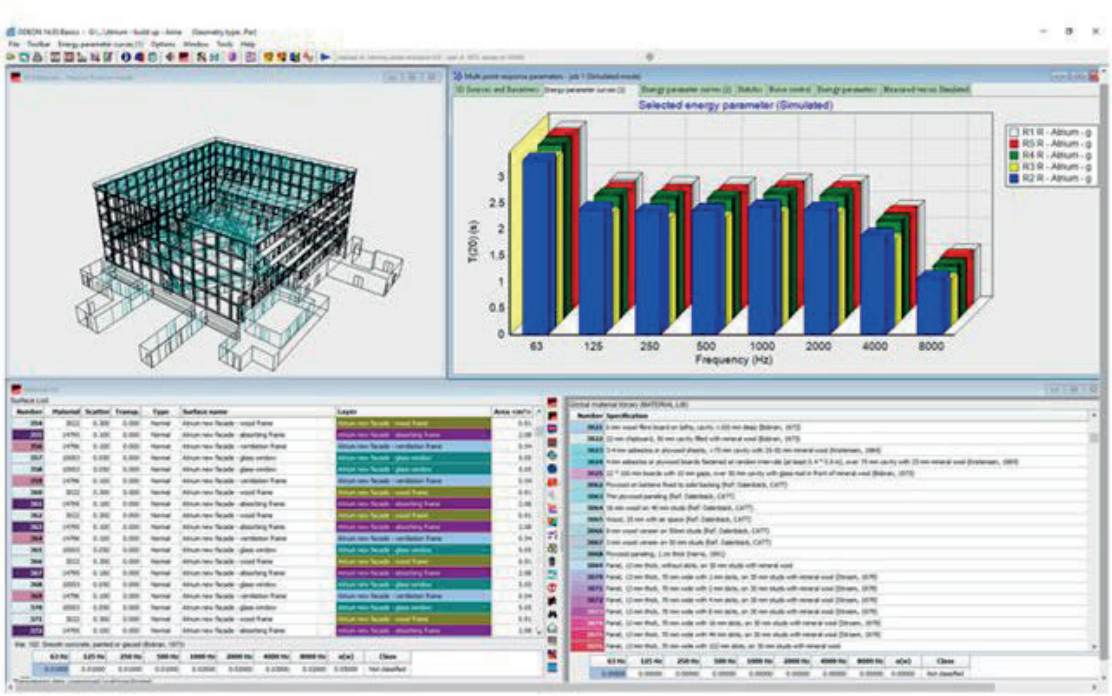
Uppsala, Sweden

Uppsala City Hall

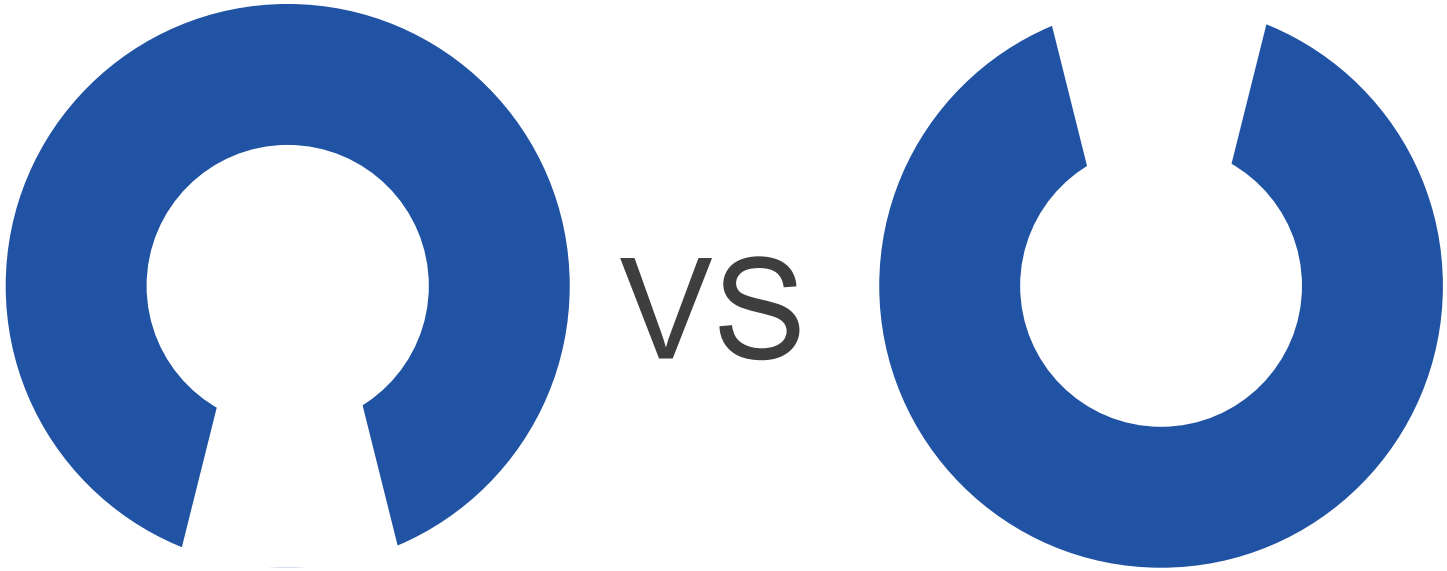
Uppsala City Hall

Research virtual acoustics





Research virtual acoustics



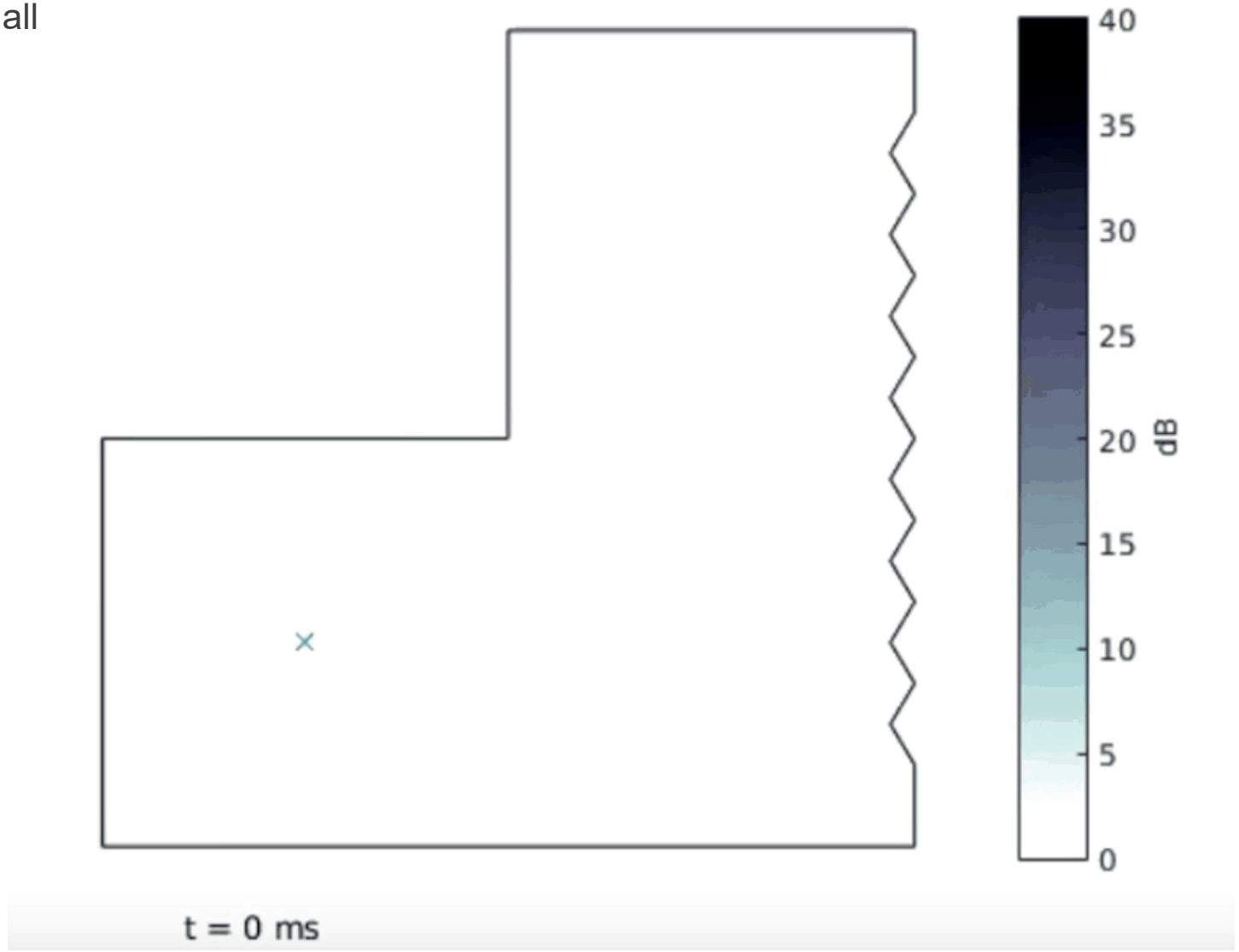
closed source

open source

Uppsala City Hall

Combining technologies

Uppsala City Hall

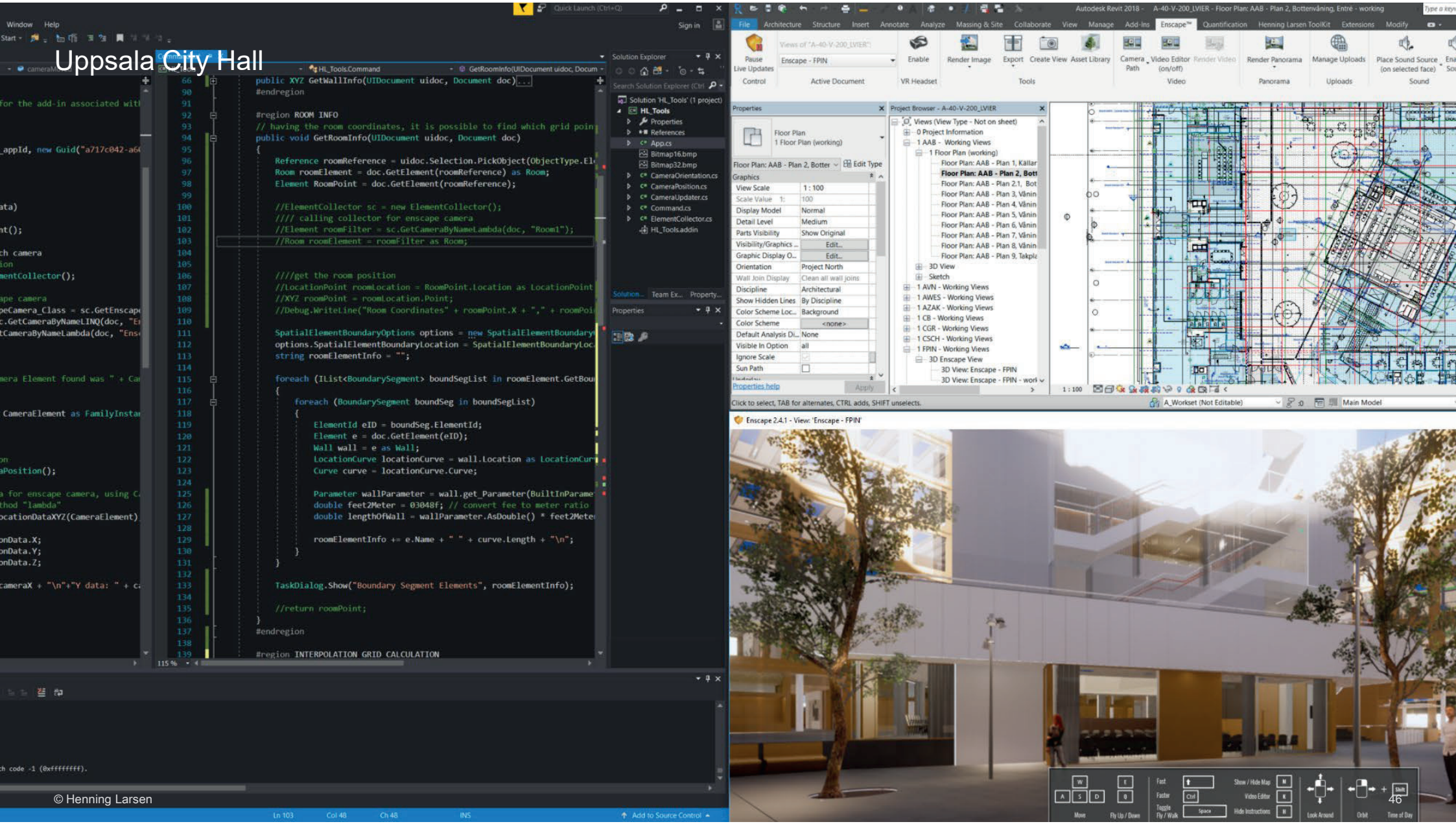


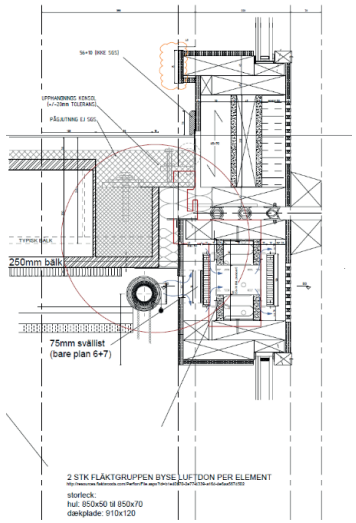
Uppsala City Hall

Virtual soundscapes and immersive audio

– new technologies to engage the user

Uppsala City Hall



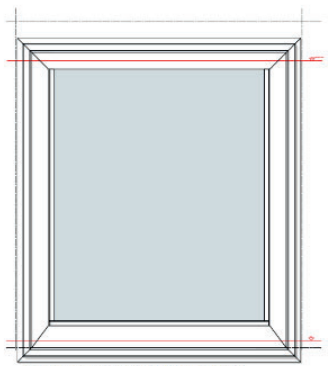


2 STK FLÄKTGRUPPEN BYSE LUFTDON PER ELEMENT

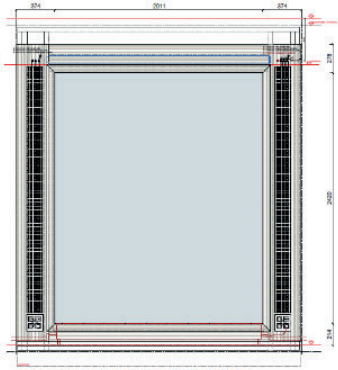
slotteck:
hul: 850x50 til 850x70
dækplade: 910x120

luftflöde per luftdon: 70 l/s @ 15Pa*
*Luftflöden kommer ned, når man kombinerer med perforeret faner + stomme.

Reduktionstal R2 i dB:
Rw 40 ved montage i oipsvæg.



Gatafasaden - uppställning mot gata (plan 4, 5, 6)



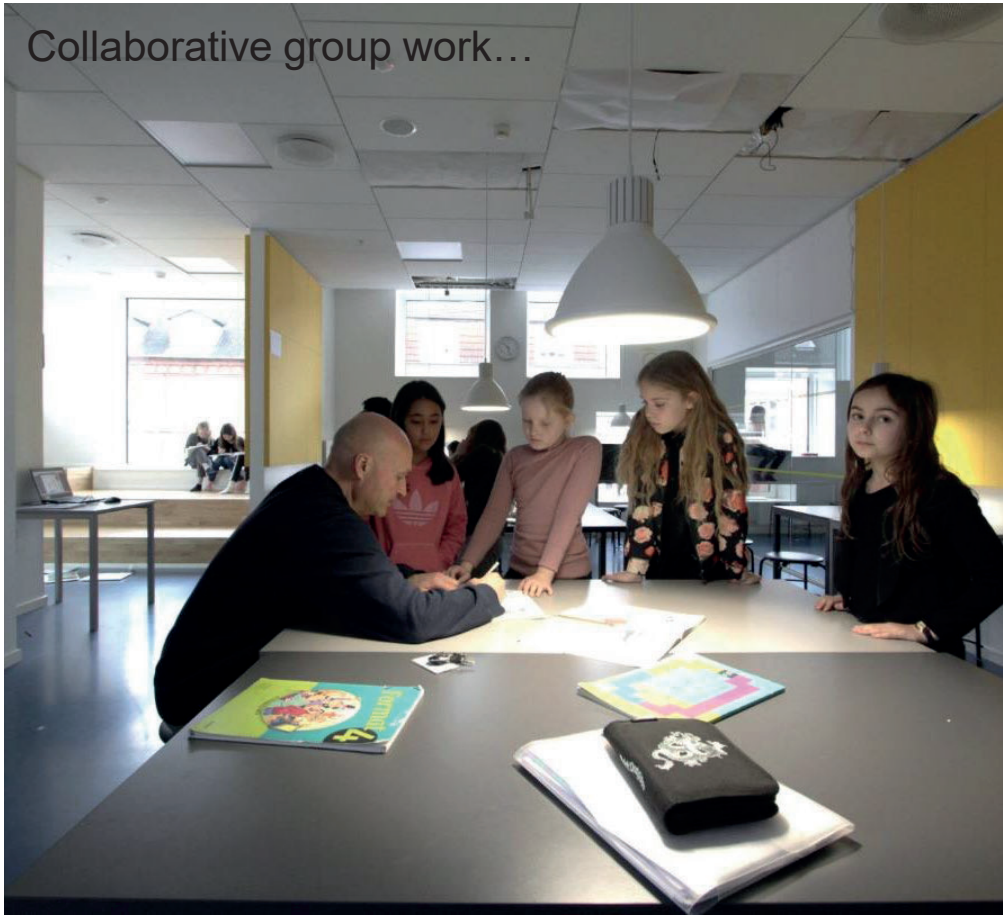
Gatafasaden - uppställning mot kontor (plan 4, 5, 6)

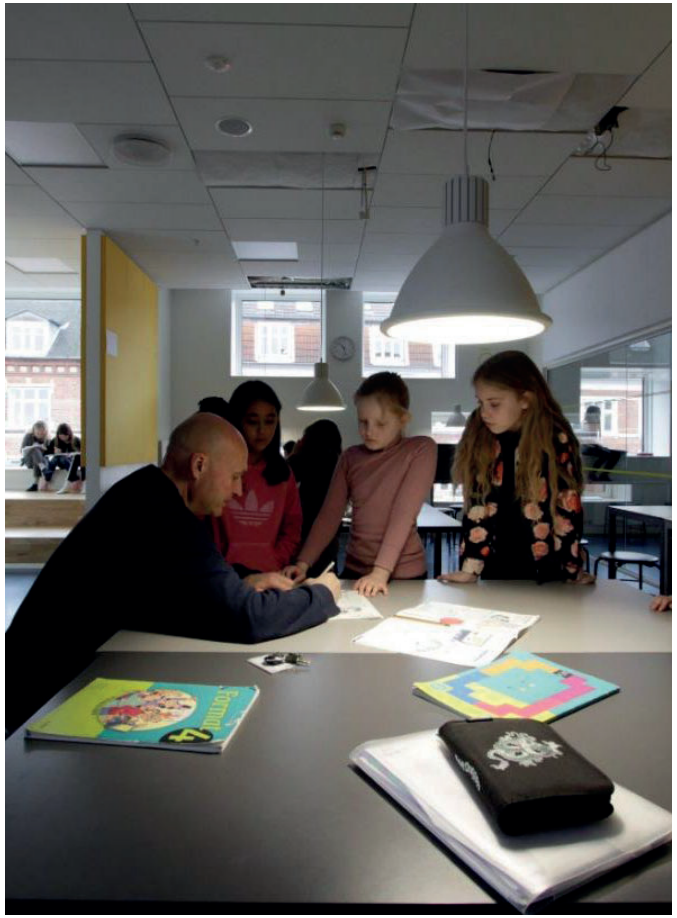
Aarhus, Denmark

Frederiksbjerg School

Frederiksbjerg School

A new way of learning about…





AARHUS UNIVERSITET

DANMARKS PÆDAGOGISKE UNIVERSITETSSKOLE
AARHUS UNIVERSITET

DTU Danmarks Tekniske Universitet

ELFORSK

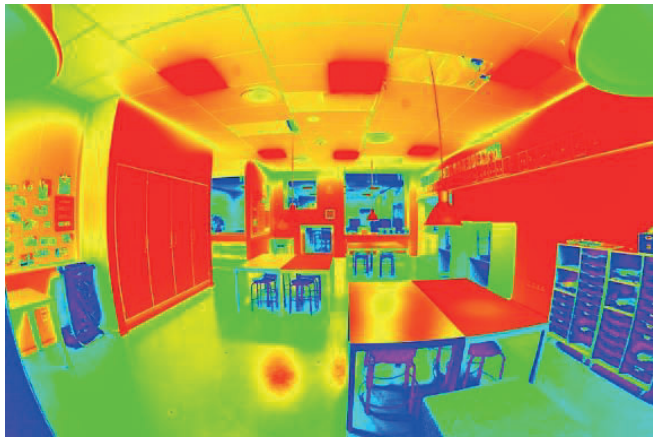
Combining the audio and visual human experience

New Research in Light, Acoustics and Learning

Experimenting with mood lighting

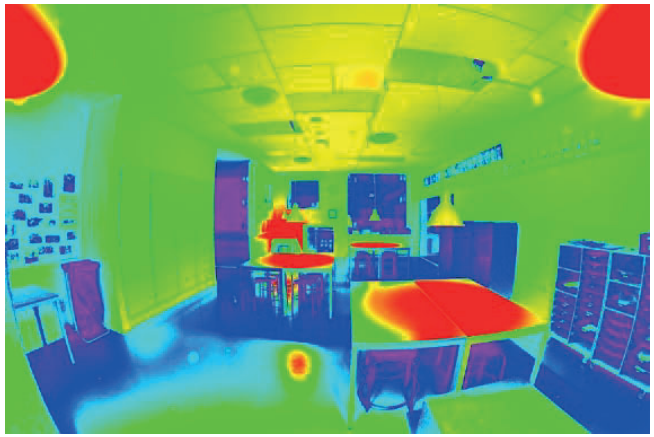
Normal

Ambient Lighting

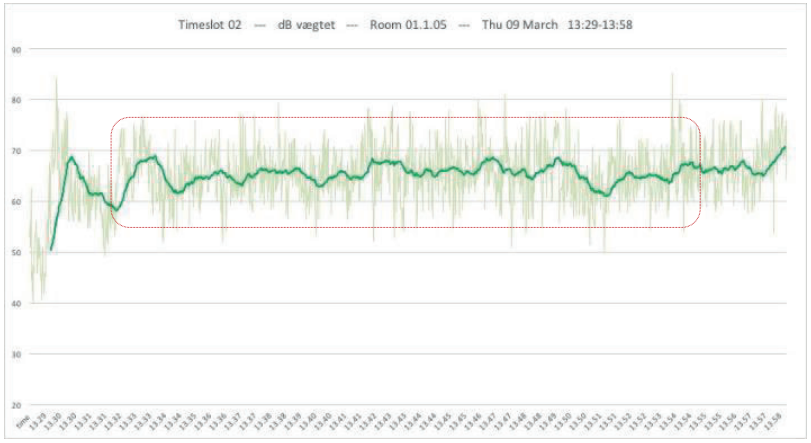


Experiment

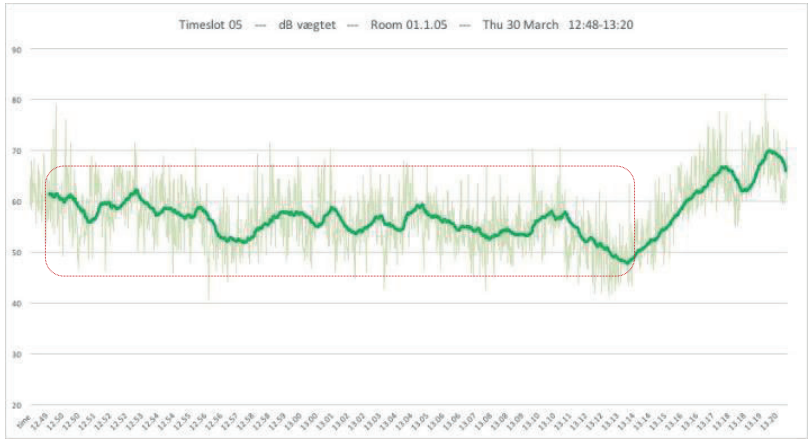
Focused lighting



Default, traditional ceiling lighting
(video snapshot)



Pendant lighting activated
(video snapshot)



Findings

Vores data peger på et fald på mellem 2 – 8 dB

- 1 dB: Mærkbart med særligt udstyr i et lydtæt rum
- 2-3 dB: Mærkbart i et “normalt miljø” (men måske bemærker du det kun, når adspurgt)
- **4-6 dB: Meget mærkbart i “normalt miljø” (elever vil mærke forskellen)**
- 7-8 dB: Signifikant. Det vil være meget tydeligt.
- 10 dB: 50% forandring, der er meget hørlig

64 dB

58 dB

64 dB

58 dB

Samlet resultat:

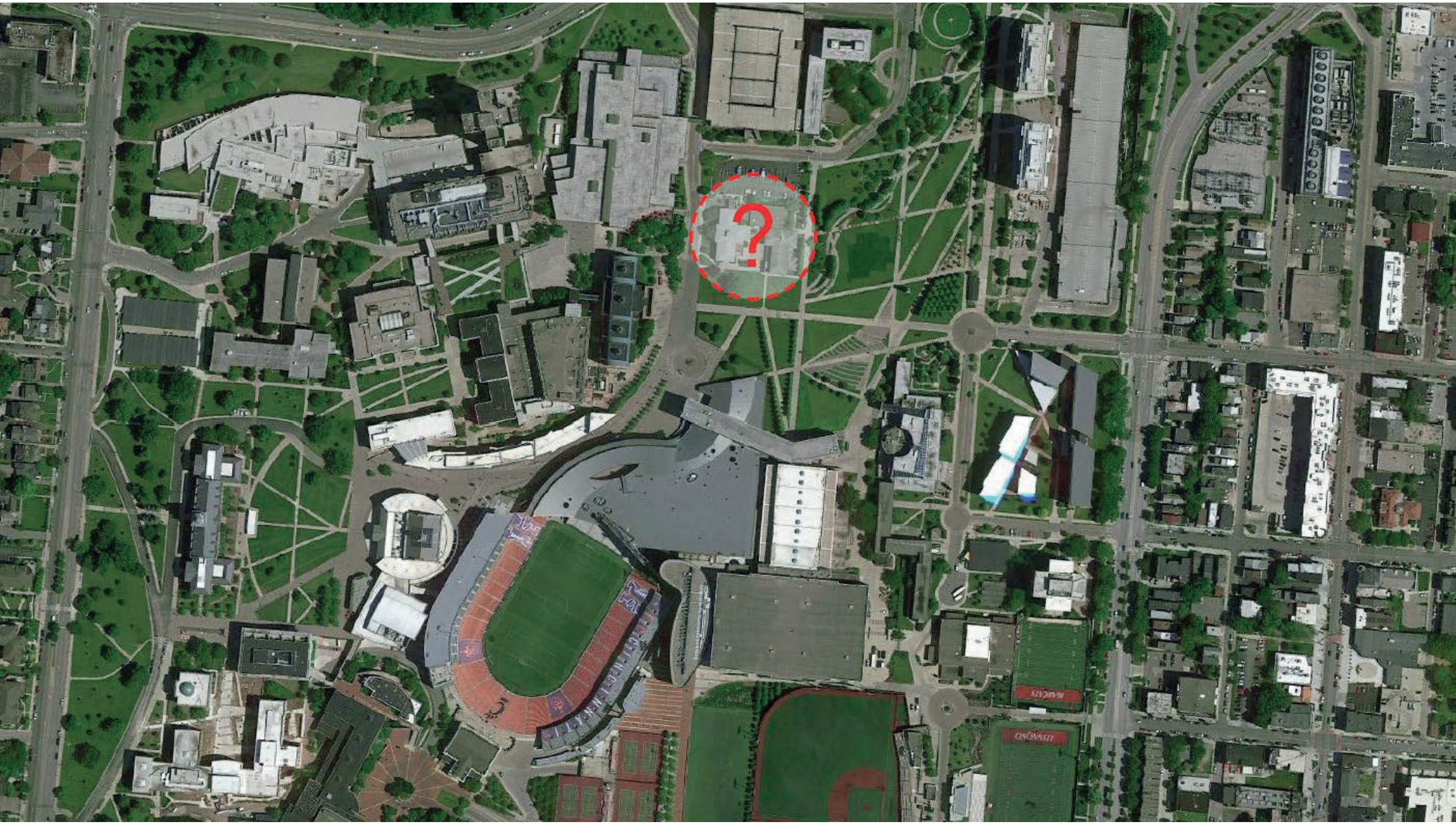
- Ro på børnene
- Hyggeligere
- 35% lavere energiforbrug til el
- Mindre støj - optil 8 dB(A)
- Ny forretning

Carl H. Lindner College of Business

Location
Cincinnati, Ohio, USA

Gross floor area
22,500 sqm

Status
Under opførelse


?
BEARCATS
CINCINNATI

Young adults are the loneliest generation in America.

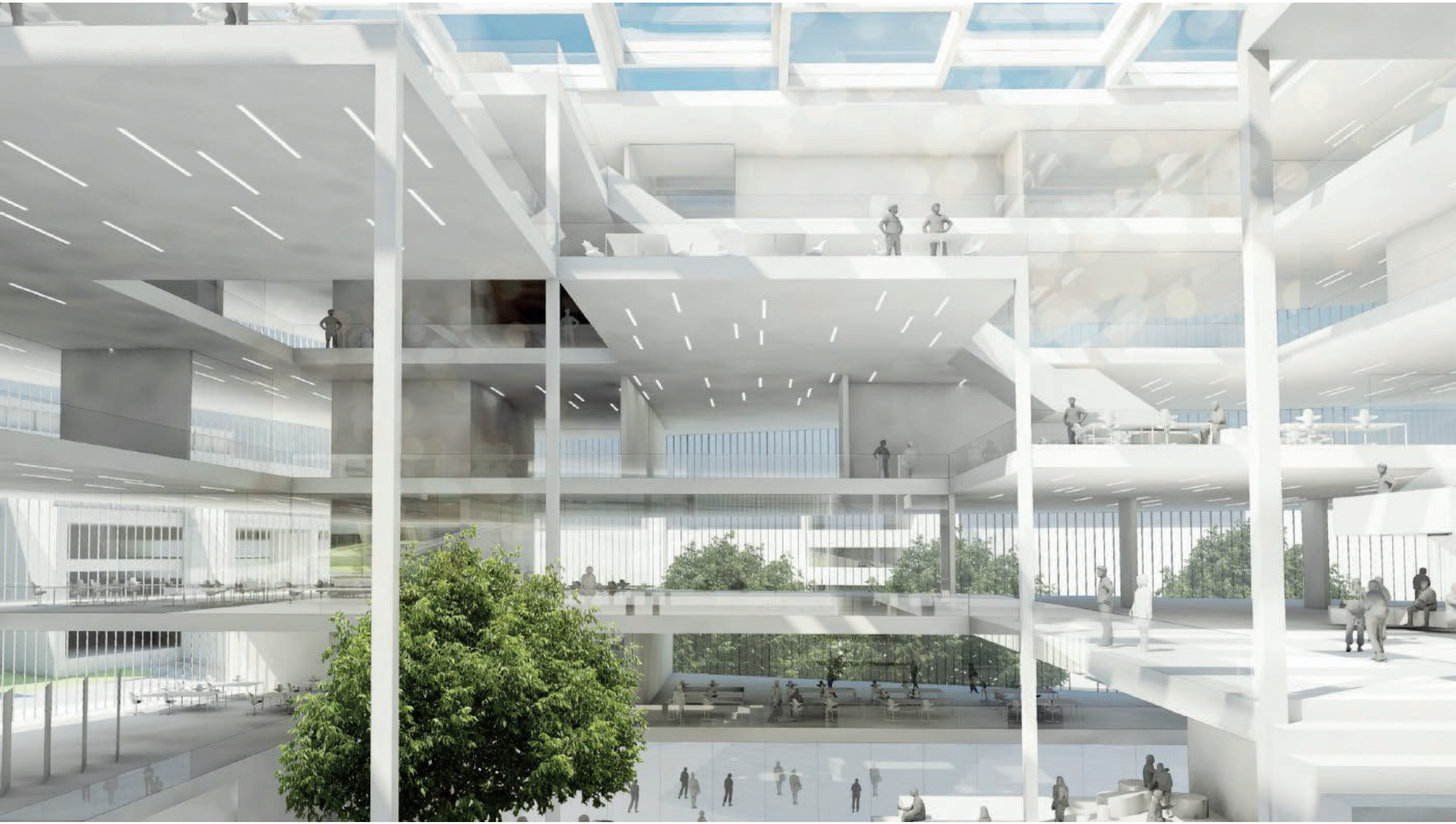
Source: Cigna

Lonely millennials twice as likely to experience depression or anxiety

29.3% of UC students felt so depressed that it was difficult to function. (2016)

STUDENT WELLNESS CENTER

University of CINCINNATI



“You don’t know what inclusivity means to us.”

David Szymanski
Dean, Lindner College of Business
University of Cincinnati

“How can we ensure new kinds of environments don’t become empty, unused spaces?”

Drew Thilmany, Henning Larsen

Ph.d. stud., Anthropology

Inclusivity has a scale

Anonymity (DK)

Recognition (US)

Transforming the circulation spaces into social interaction spaces

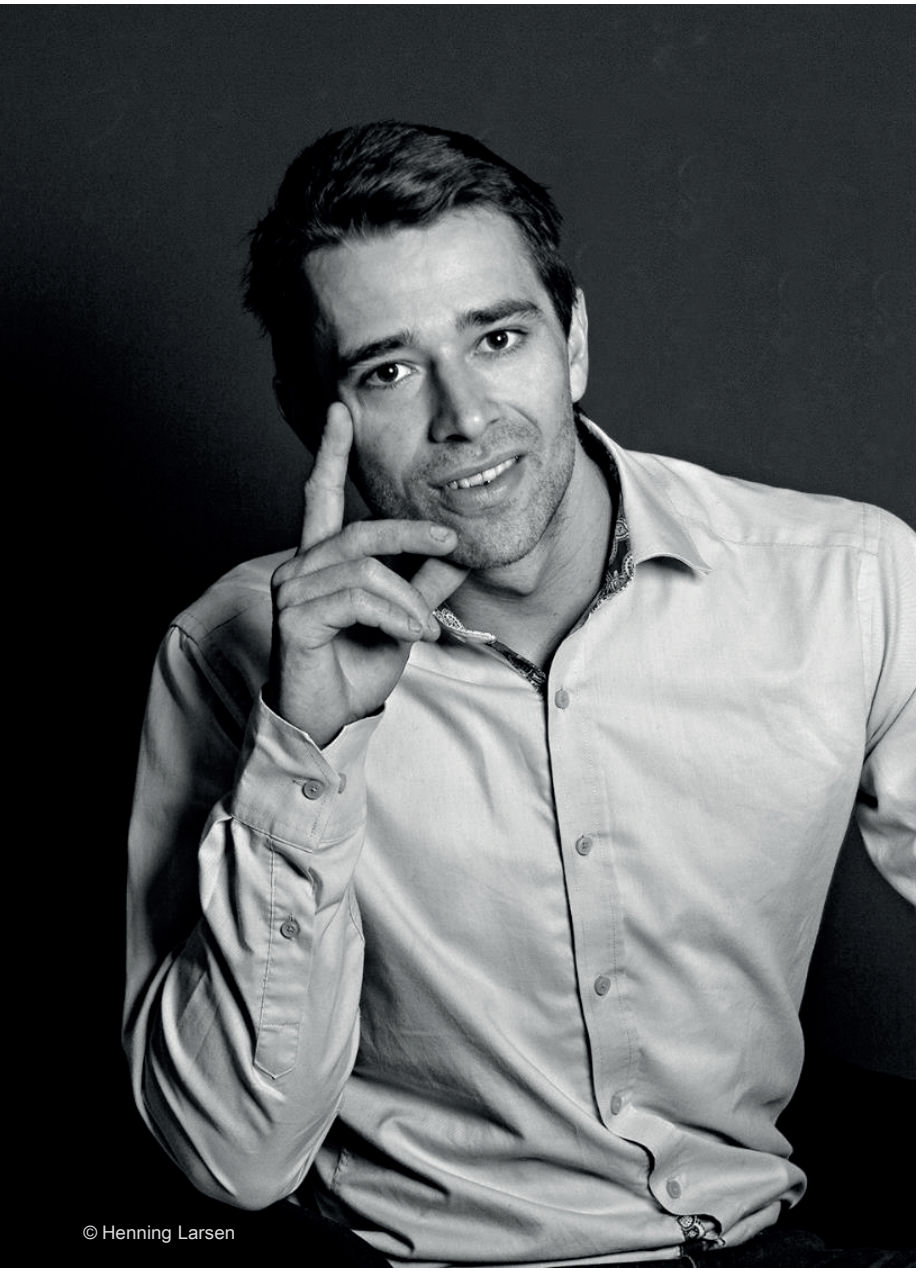
Before

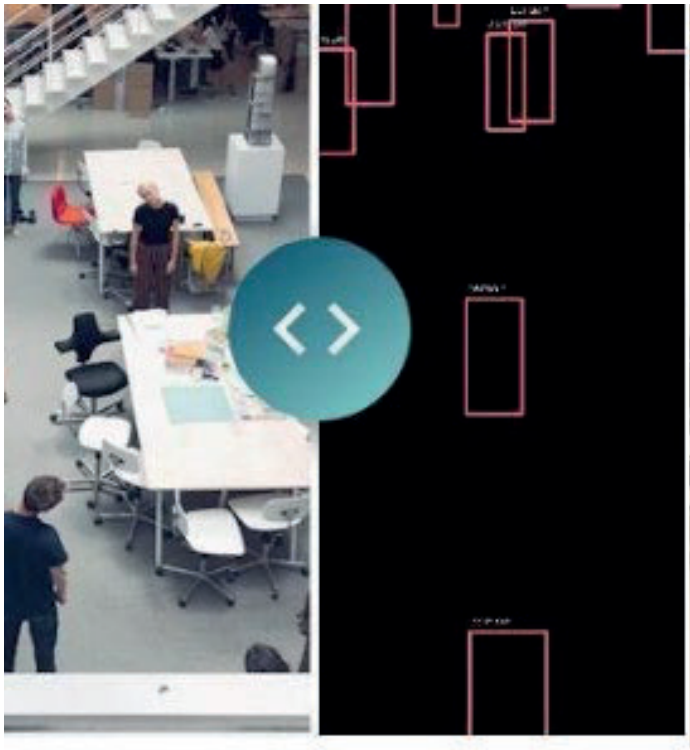
vs.

Future

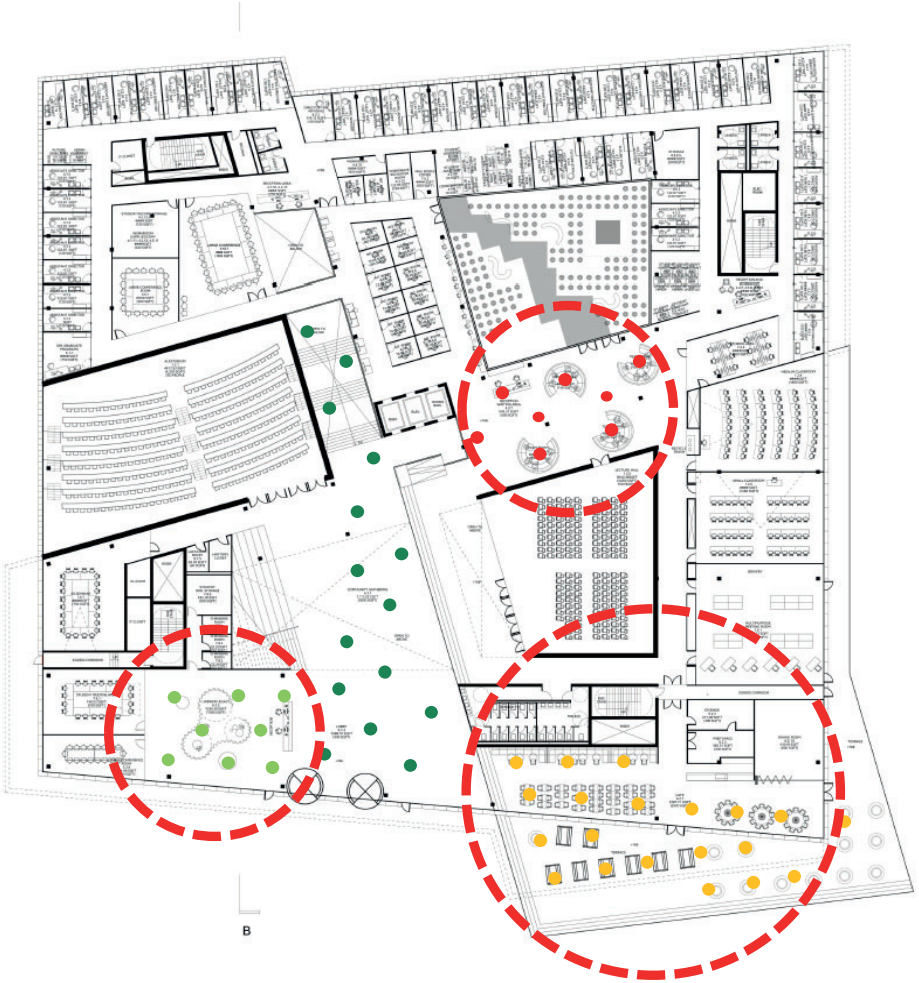

Turner
University of
CINCINN

How can we document the effect?


© Henning Larsen



Where do we measure ?



Building Typologies
- Functions and intended designs

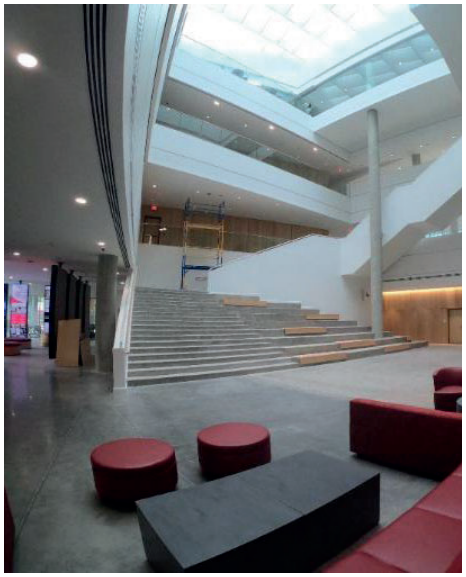
Physical Environment
- Layout and ratios
- Design elements

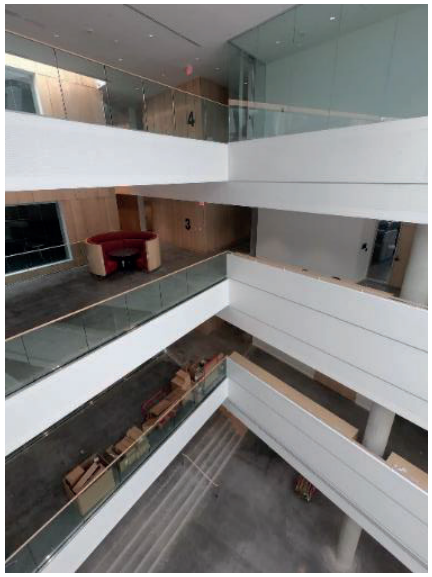
Flows & Occupancy
- Behvioral patterns

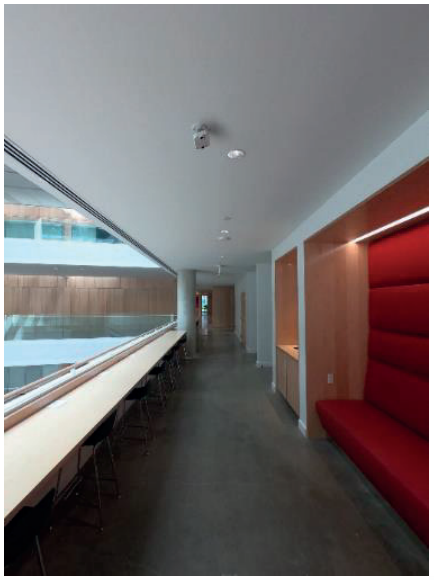
Indoor Climate
- Noise and Light
- Temperature

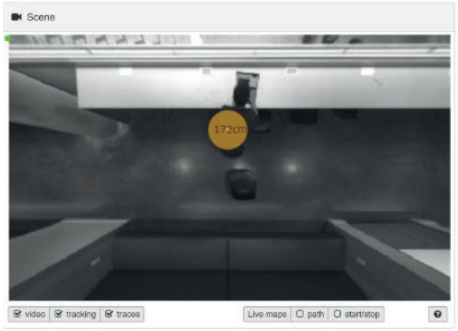
Usage & Activities
- Optional vs. necessary

Where do we measure ?









Dashboards


Camera Name
All
Date
04-08-2019
01-01-2020
HourKey
15
23
Camera Name
Atrium
Unique ID Count by Day of Week Name and Camera Name
Camera Name Atrium Café Entrance Roundtable WallWork
1.500
1.000
500
0
mandag
tirsdag
onsdag
torsdag
fredag
lørdag
søndag
Unique ID Count by HourKey and Camera Name
Camera Name Atrium
1.000
800
600
400
200
0
15
16
17
18
19
20
21
22
23
%GT Unique ID Count by Day of Week Name
60%
40%
20%
0%
mandag
tirsdag
onsdag
torsdag
fredag
lørdag
søndag
X and Y
400
300
200
100
0
Y
200
300
400
500
600
X
Filters
Visualizations
Details
Add data fields here
Legend
Add data fields here
X Axis
X
Y Axis
Y
Size
Add data fields here
Play Axis
Add data fields here
Tooltips
Add data fields here
Drillthrough
Cross-report
Off
Keep all filters
On
Add drillthrough fields here
Fields
Search
Key Measures
Camera Coordinate...
Camera Coordinate...
Camera Coordinate...
Cameras
Date
subset_merged
Time

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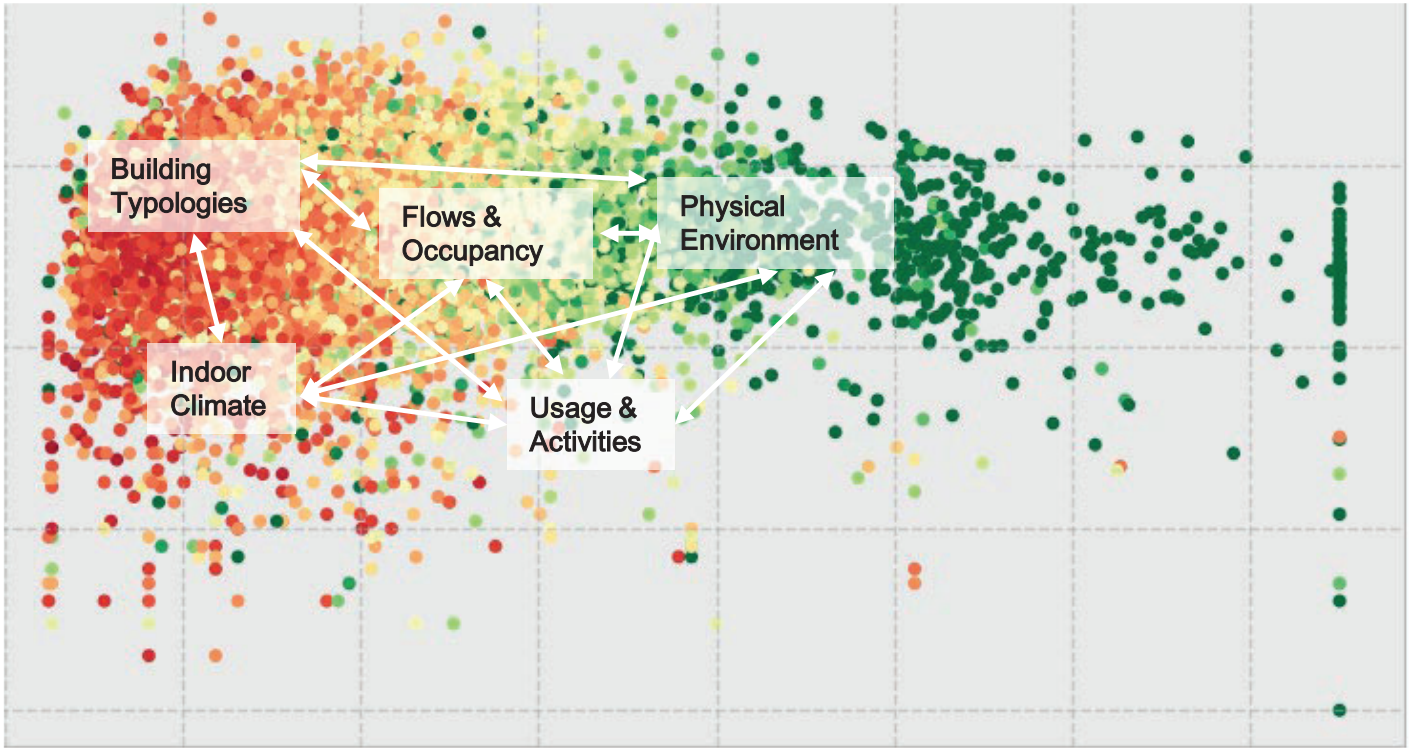
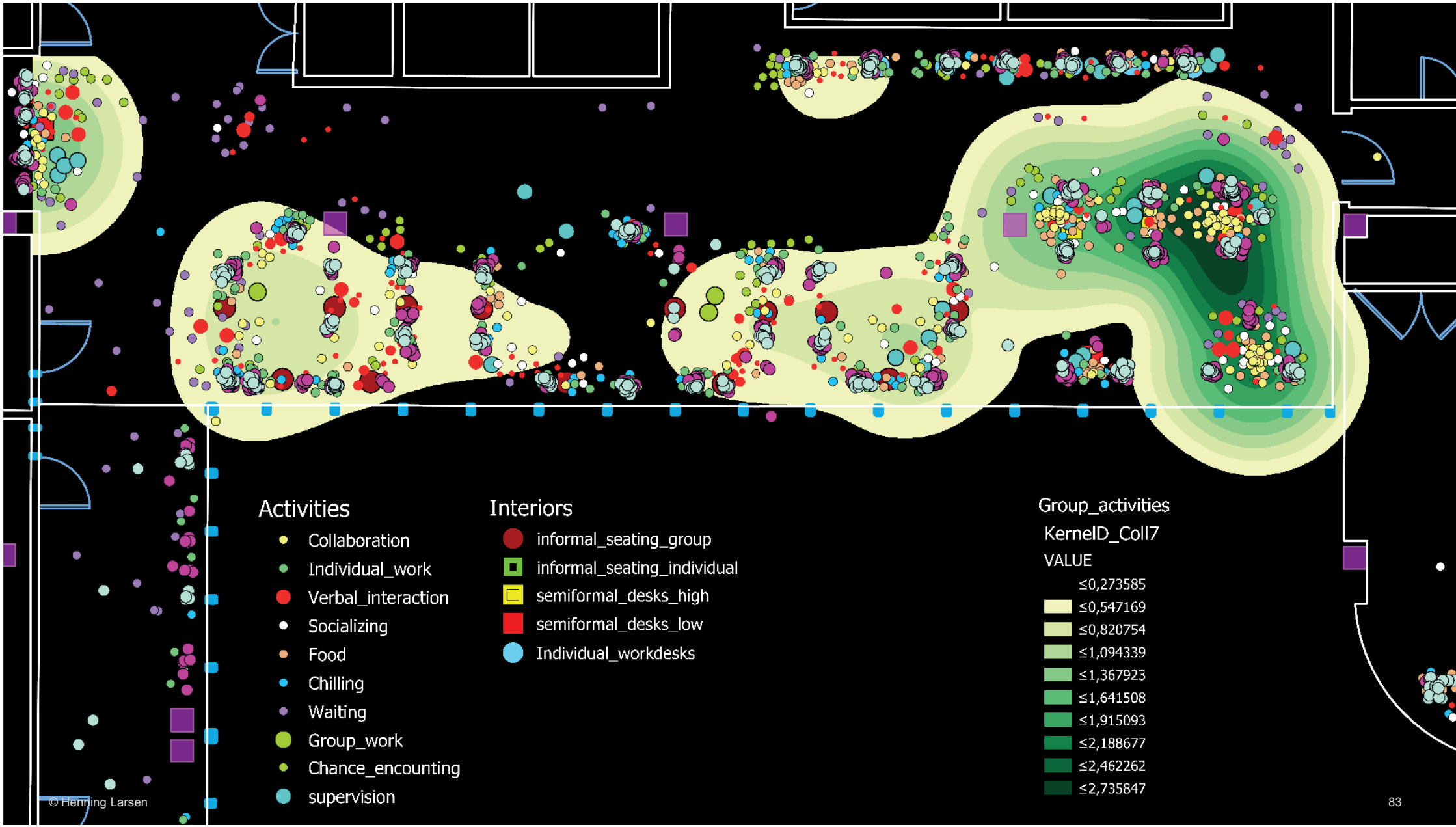
Clustering and Classification

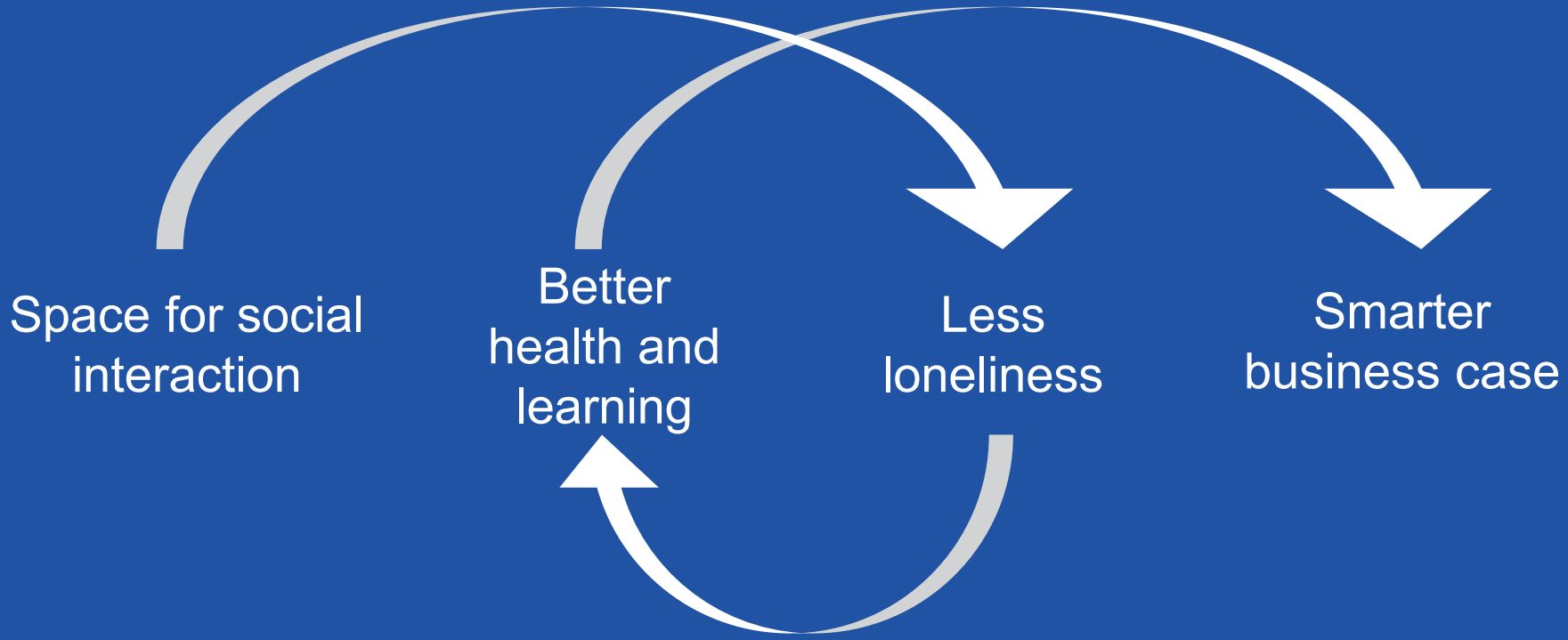
The clustering algorithms: Create heat maps of users and activities in the different building functions.

The classification algorithms: Identify and predict correlations between users and space conditions.



Source: https://files.realpython.com/media/gridspec_ex.9bce5a0726e9.png





“We shape our buildings and afterwards our buildings shape us.”

Winston Churchill

Henning Larsen

Tak!

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