### Built Environment Lightning Talks

**How do you foresee new technologies shaping our future?**

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WHY DOES IT MATTER?
DESIGNED FOR HUMANS
York, England

DESIGNED FOR CARS
Somewhere, USA
BABY BOOMERS
~1945 - 1976
• Prioritize privacy
• Prefers low-density living
• Low use of public transit

MILLENNIALS
~1977 - 1994
• Prioritize social interactions
• Prefers urban living
• Prefers walking and biking

GEN Z
~1995 - 2012
• Prefers independence?
• Prefers home ownership?
• Less likely to use public transit?
WE ARE
“ABOUT TWO YEARS”
AWAY FROM SLEEPING IN
OUR CARS

- ELON MUSK 2017
THE FUTURE OF COMMUTING?
PARKING LOTS = HOUSING DEVELOPMENTS?
HOW MIGHT AUTONOMOUS VEHICLES DECIDE WHERE WE ARE GOING TO LIVE AND WHAT OUR NEIGHBORHOODS WILL LOOK LIKE?
SCENARIO 1: INCREASED SPRAWL
SCENARIO 2: CLOSE-IN DEVELOPMENT
OUR TECHNOLOGY WORLD
THE POWER IS IN YOU

THANK YOU
Big Data & Mass Transit:
The Missing Puzzle Piece

Presenters: Joel Hill & Matthew Hlavaty
Mass Transit: Where are we now?
WHAT IF I TOLD YOU
YOUR FEEDBACK COULD DETERMINE OUR FUTURE?
APC - DETECTING YOUR PRESENCE... UNDER THE RADAR!
Give me your money!
Live time schedules, Portland vs Seattle!
WHERE DO WE GO FROM HERE?

And where do YOU fit in?
Programs and Studies

Federal Transit Administration

American Public Transportation Association
Technologies in Action
Technologies in Action

Accenture Dynamic Transport Solution

Real time

Predictive

Intelligent Decision Making

Self Maturing

Commuter

"I had such a long day at work—it's peak hour and I just want to have a seat to myself, but not pay the peak hour charge for a taxi?"

If commuter usually takes longer than average to get to bus stop and always prefers a double decker bus...
Capacity on possible routes... Will vary by day...
Traffic likely to worsen...
Capacity will likely increase...
Unlikely of getting a seat...

*Address commuter experience in control, comfort and convenience

Authority

"Demand in Zone 2 has increased and is likely to push capacity on Routes 10, 7A, 250 over 80%. Recommend premium shuttle for Route 10 and assign taxis."

Refining capacity controls based on historical and external factors...
Capacity is reaching threshold...
Ejects to max - demand likely to increase...
Dynamic traffic assignment options...

*Better service metrics for operators
*Optimize transport network planning and operations
*Improve incident / network forecasts and response

Service Provider

"50% discount on for 1 hour at City College Bus Station."

*Location based advertising channels
*Location based retail services
*Potential partnerships with other service providers / operators

Operator

"I need to deploy a premium shuttle for Route 10."

Additional supply added to routes...
Authority instructs operations who execute action...
New option more likely to fit commuter preference...

*Better utilization of capacity in fleet management

Strategy | Consulting | Digital | Technology | Operations
New and Emerging Technologies
The Future...
The Environmental Impacts of New Mobility

Luke Ralston, University of Oregon Portland Graduate Architecture Student

Photo: Luke Ralston
Looking to the Future

Autonomous Vehicles are Broadly Implemented

Majority of Vehicles are Electric
The Environment

Social

Ecological
Looking at

Three Scenarios... of many

Mass-Transit Use
Decreases

Street Lane Size
Decreases

Sprawl
Increases
Scenario One

Mass-Transit Use Decreases
Why?

Convenience of Ride Sharing reinforced by AV potentials

Survey question: “Since you started using on-demand mobility services such as Uber and Lyft, do you find that you use the following transportation options more or less?”

Figure 12. Changes in transit use, biking, and walking after adoption of ride-hailing services

- Public bus: -6%
- Heavy rail: 3%
- Light rail: -3%
- Bike: -2%
- Walk: 9%

Charts from Oct. 2017 study by the UCDavis Institute of Transportation Studies, “Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States”
Implications... of many
Job Loss & Impacts on Low-Income Populations & Disabled

Study by the American Public Transity Association 2007
“A Profile of Public Transportation Passenger Demographics and Travel Characteristics Reported in On-Board Surveys”
Implications... of many
Increased Reliance on Cars, Resource Demand, & Congestion
Scenario Two

Street Lane Size Decreases
Why?
More Precise Driving my an Automated Vehicle

Lane Width
Lane widths can be kept to a minimum. In most urban environments, lanes of 10’ or less suffice with controlled lane guidance, and streets without large transit vehicles can be even smaller if adjacent flexible space is available. In the long term, lanes should not be demarcated by markings, but instead be relatively flush with the sidewalk and median, with elements like bollards, accessible textured pavers, or other cues to demarcate uses.
Implications...of how new space is used
Implications... of how new space is used
Scenario Three

Sprawl Increases

Photo: Remi Jouan
Implications...of many
Increased Reliance on Cars & Resource Demand, Biodiversity/Agriculture and Social Implications
Three Scenarios... of many
Policy Influencer
Nacto Blueprint for Autonomous Urbanism

Safety is the Top Priority
Mobility for the Whole City
Rebalance the Right-of-Way
Manage Streets in Real Time
Move More with Fewer Vehicles
Public Benefit Guides Private Action
Our five plays are to:

**PLAY 1:**
Ensure new mobility delivers a fair and just transportation system for all

**PLAY 2:**
Enable safer, more active, and people-first uses of the public right of way

**PLAY 3:**
Reorganize and retool SDOT to manage innovation and data

**PLAY 4:**
Build new information and data infrastructure so new services can “plug-and-play”

**PLAY 5:**
Anticipate, adapt to, and leverage innovative and disruptive transportation technologies
The Environmental Impacts of New Mobility

Luke Ralston, University of Oregon Portland
Graduate Architecture Student

Thank You
495,000 Population

2.5 MILLION Fringe Festival Attendees
ADAPTABLE STRUCTURES | EXCITING SPACES
RETHINKING THE ROLE OF URBAN INFRASTRUCTURE

SOURCE: GENSLER
PRIORITIZING THE HUMAN EXPERIENCE | SHARED STREETS
RETHINKING THE ROLE OF URBAN INFRASTRUCTURE

SOURCE: PERKINS + WILL, NELSON/NYGAARD, LYFT
LARGEST URBAN AGGLOMERATIONS, 1975, 2000, 2025

SOURCE: UNITED NATIONS, WORLD URBANIZATION PROSPECTS: THE 2007 REVISION
EXPERIENCE | SOCIAL TRUST | INTERCONNECTEDNESS

SOURCE: CHICAGO POLICY REVIEW
Avionics & Robotics
Autonomous Systems
Regulation

Model Aircraft Operating Standards

Federal Aviation Administration Advisory Circular 91-57A September 2, 2015

Section 336 of P.L. 112-95 defines a model aircraft as an unmanned aircraft that is capable of sustained flight in the atmosphere, flown within visual line of sight of the person operating the aircraft, and flown only for hobby or recreational purposes.

Fixed Wing Aircraft

Multicopter Aircraft

400 feet

<1,000 feet*

Daytime Only

*<1,000 feet is the approximate maximum range to distinguish a 2 foot object with normal (20/20) vision

Model Aircraft Operations Imaginary Surfaces

1. The Aircraft is flown strictly for hobby or recreational use

2. The aircraft is operated in accordance with a community-based set of safety guidelines and within the programming of a nationwide community-based organization (CBO)

3. The aircraft is limited to not more than 55 pounds unless otherwise certified through a design, construction, inspection, flight test, and operational safety program administered by a CBO

4. The aircraft is operated in a manner that does not interfere with and gives way to any manned aircraft

5. When flown within 5 miles of an airport, the operator of the model aircraft provides the airport operator or the airport air traffic control tower (when an air traffic facility is located at the airport) with prior notice of the operation. Model aircraft operators flying from a permanent location within 5 miles of an airport should establish a mutually agreed upon operating procedure with the airport operator and the airport air traffic control tower (when an air traffic facility is located at the airport).
Unmanned Aerial Vehicles
Science & Technology
Recreation & Entertainment
Business & Commerce
Farming & Fishing
Emergency Management
UAS Safety
Privacy
Property Rights
Nuisance
Personal Drones
Thank you for your time

Images
Aeavena Aire, Amazon PrimeAir, Aibotix X6, ATI AgBot, Back to the Future Part II, *batteries not included, Beaverton Round photomosaic, Desert Wolf Skunk Riot Control Copter, eHang 184, ESPN Drone Racing League, Internet of (moving) Things illustration, Mars Mini Ballistic Parachute, Model Aircraft Operating Standards infographic, Mt Angel zebra stripe photosimulation, No Drone Zone signs, ProDrone, Rutgers University Naviator, Telephoto camera photosimulation, Unmanned Aerial Vehicles infographic, Volocopter, Westbrook Neighborhood Mayday Disaster Exercise map

Ric Stephens
Certified Remote Pilot, Federal Aviation Administration
Instructor/Remote Pilot, Oregon State University PACE
Instructor/Remote Pilot, Portland Community College
Instructor, University of Oregon
Member, Association for Unmanned Vehicle Systems International
President, International Society of City and Regional Planners
Vice Chair for Special Projects, American Planning Association International Division
CITIES ARE GOING TO CHANGE DRAMATICALLY OVER THE NEXT 20 YEARS, BECAUSE THEY HAVE TO.
We are Developers, Architects, and General Contractors.

Therefore, we are free.
The Bullitt Center
Seattle

Radiator
The tallest timber building constructed in Oregon in over 100 years.
TIMBER IS OUR COUNTRY’S GREATEST NATURAL AND RENEWABLE RESOURCE.

Perhaps we should rely on our own energy supplies, and manage their impacts, rather than continuing to import our energy sources and exporting the repercussions.
Stores Carbon

Renewable Resource

Fire Performance

Weight - 80% Lighter

Seismic Performance

Energy Efficient
WHY AREN’T WE USING THIS RENEWABLE RESOURCE TO BUILD OUR TALL BUILDINGS?
There have been tall wooden buildings built around the world for centuries. This temple, in Japan, is 180’ tall and was built over 1,000 years ago.
The Ingalls Building, constructed in Cincinnati in 1904, ushered in the era of the concrete high-rise. This technology coincided with the San Francisco Fire of 1906. Interestingly, however, the fires were caused by an earthquake….
CARBON12
THE TALLEST MASS-TIMBER BUILDING IN THE UNITED STATES
35 lbs. per cubic foot

580,121 lbs. of wood in Carbon12 structure

150 lbs. per cubic foot

2,900,000 lbs. of concrete

490 lbs. per cubic foot

CO₂

CO₂

CO₂
This building weighs 25% of what it would have weighed had we built it with concrete.

Consider 75% less weight when coordinating fabrication, shipping, safety, lifting, and energy use.
The Canyons

Multifamily residential building with ground-floor retail.

Barrier free living for an aging population.
The Spar

440' tall, with a pledge to plant the trees equal to those used in the structure prior to breaking ground.
Deep Learning and the Future of the City

Ryan McCullough
r&d @ Ankrom Moisan Architects
S-Curves in Innovation
S-Curves in Innovation
DEEP LEARNING AS ENABLING LAYER

- autonomous vehicles
- augmented reality
- smart cities

DEEP LEARNING

(DECADIES OF OTHER TECH)

PROGRAMMING LANG'S

MACHINE 0'S AND 1'S

deep learning is an enabling layer
Deep Learning
= Patterns
Patterns Enable Representation

PARK or BUILDING?

INPUT (AN IMAGE)

MATH! \( \sum_{i=0}^{n} (W_i + X_i) + b \)

OUTPUT (A REPRESENTATION)

NEURON

BUILDING

PARK

\[ \_\_\_ \]
Patterns Enable Representation

PARK or BUILDING?

INPUT (AN IMAGE)

output

foundational representations (edges -> fur -> dog)

input
WHAT PATTERNS CAN YOU LOOK FOR?

“Is there a building in this picture?”
“Will that car let me merge?”
“Which lot will redevelop next?”

AND THE UNKNOWN UNKNOWNS....
Automation

You don’t get one worker, you get a million.

Each type of worker can do a very specific task.

Massive multiplier effect - think steam engine or Ford assembly line.
So, what can we automate right now?

Current Analysis
Improved quality answers for questions you're already asking.

New Analysis
New kinds of questions for data that we already have.

New Data
Data types computers couldn't read before. Image, video, etc...
What happens if computers can see the way they can currently read or count?
Automated analysis of construction process?
Automated traffic analysis.
Mixed Reality is its own entire S-Curve.
Urban Scale Trends and Patterns

Unsupervised deep learning can be used to uncover patterns in the data that beg questions.

Recurrent neural networks allow time-series analysis for prediction and anomaly detection.

Development trend analysis and demographic clustering
Ankrom Moisan Research and Development
Reducing documentation.

Translate design intent directly to documentation. Reduces time / liability / fee.

Daylight maximizes the availability of natural light in the office.

Adjacency preference minimizes the travel distance between collaborating teams and preferred amenities.
Parameterizing design with VAEs.

Currently very popular with faces. No reason it should be limited to that.
Parameterizing design with VAEs.

Currently very popular with faces. No reason it should be limited to that.

What could you do with google street view?
Completely novel generative art.

Generative Adversarial Networks use multiple deep networks to generate and the judge their own creation, feeding the judgement back.

Creative Adversarial Networks take this one step further, for completely novel images.

CAN: Creative Adversarial Networks Generating "Art" by Learning About Styles and Deviating from Norms.
Facebook AI Research (FAIR)
arxiv:1706.07068
Want to learn more?

Educational resources are extremely available, many sources are even free:

- deeplearning.ai
  5 course series from one of the godfathers of deep learning

- fast.ai
  Practical deep learning for coders - FREE!

- UW Machine Learning
  5 course series covering everything isn’t deep learning - coursera.com
Get in touch with me!

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ryantm@ankrommoisan.com

I love talking about deep learning, mixed reality, generative design, and the future. Come find me, email me, tweet me, whatever... Always up to share a drink and talk tech!

Additionally, if you are a student and want to chat, I will buy you coffee, 'cause god knows you can use it.
AUTONOMOUS POTENTIAL:
REDESIGNING STREETS TO SUPPORT ACTIVE TRANSPORTATION IN AN AUTONOMOUS VEHICLE FUTURE

Stephanie Nappa
Urbansim Next Conference
03/05/2018
95% of passenger transportation will be served by autonomous shared vehicles by 2030.
VISION ZERO

NO MORE TRAFFIC DEATHS

80% of parking spaces will become obsolete due to ride sharing
Dynamics of the Future Street

Two-way Operation

One Lane Each Way

Lane Width


How do these ideas translate to a real city?

Eugene, OR as an example
Downtown Commercial

Willamette Street

Image: Streetmix
Downtown Residential

Madison Street

Image: Streetmix
Major Collector

Coburg Road
Low-density Residential

Palomino Drive
Complete Streets + Autonomous Vehicles = The Future of Mobility
Neurospatial Adaptation —
a future of responsive space.

Nicolas Smith  Architect
5 March, 2018

nsmith@hackerarchitects.com
hackerarchitects.com
nicolascsmith.com
First things first —

I am not a neuroscientist.
the beautiful promise of space...
Electroencephalography —
measure of the electrical activity in the brain.
your damn cellphone knows more about you than your family does.
Kinetic Architecture — buildings that move.
Neurospatial Adaptation
Neurospatial Adaptation —
$203,600,000,000
+/- 42 million people on 79 antidepressants
Neurospatial Adaptation —
a future of responsive space.
form
light
color
sound
compression
vantage
layering
connection
real vs. virtual
the oppressive reality of space...
the beautiful promise of space...
CITIES ARE ABOUT TO GET DARKER + A LOT MORE BEAUTIFUL
## Built Environment Lightning Talks

**Monday, March 5, 3:30 PM at the 2018 Urbanism Next Conference**

**www.urbanismnext.com**

**How Do You Foresee New Technologies Shaping Our Future?**

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