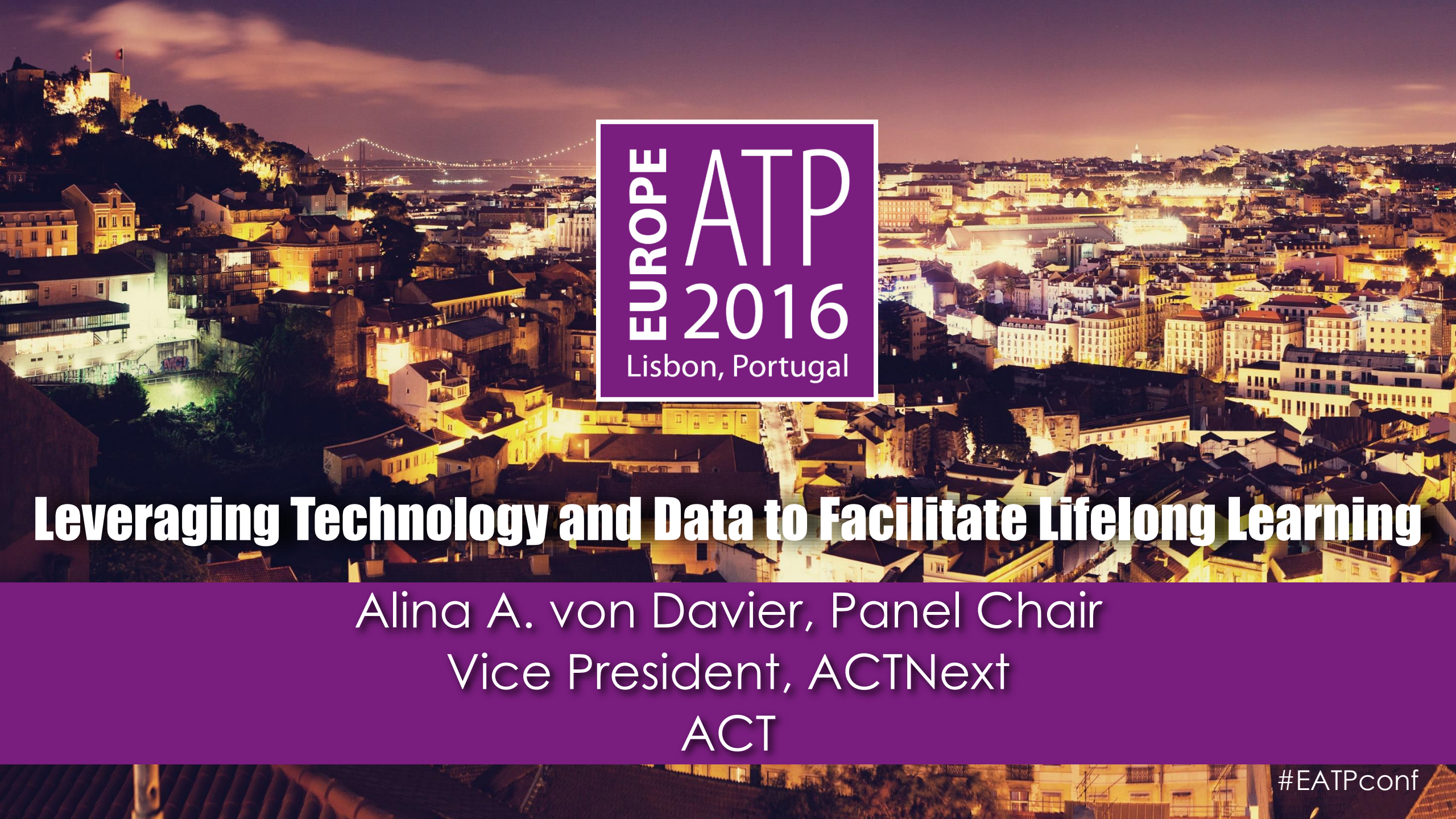

Leveraging Technology and Data to Facilitate Lifelong Learning

Alina A. von Davier, Panel Chair
Vice President, ACTNext
ACT

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Research-Driven Innovation

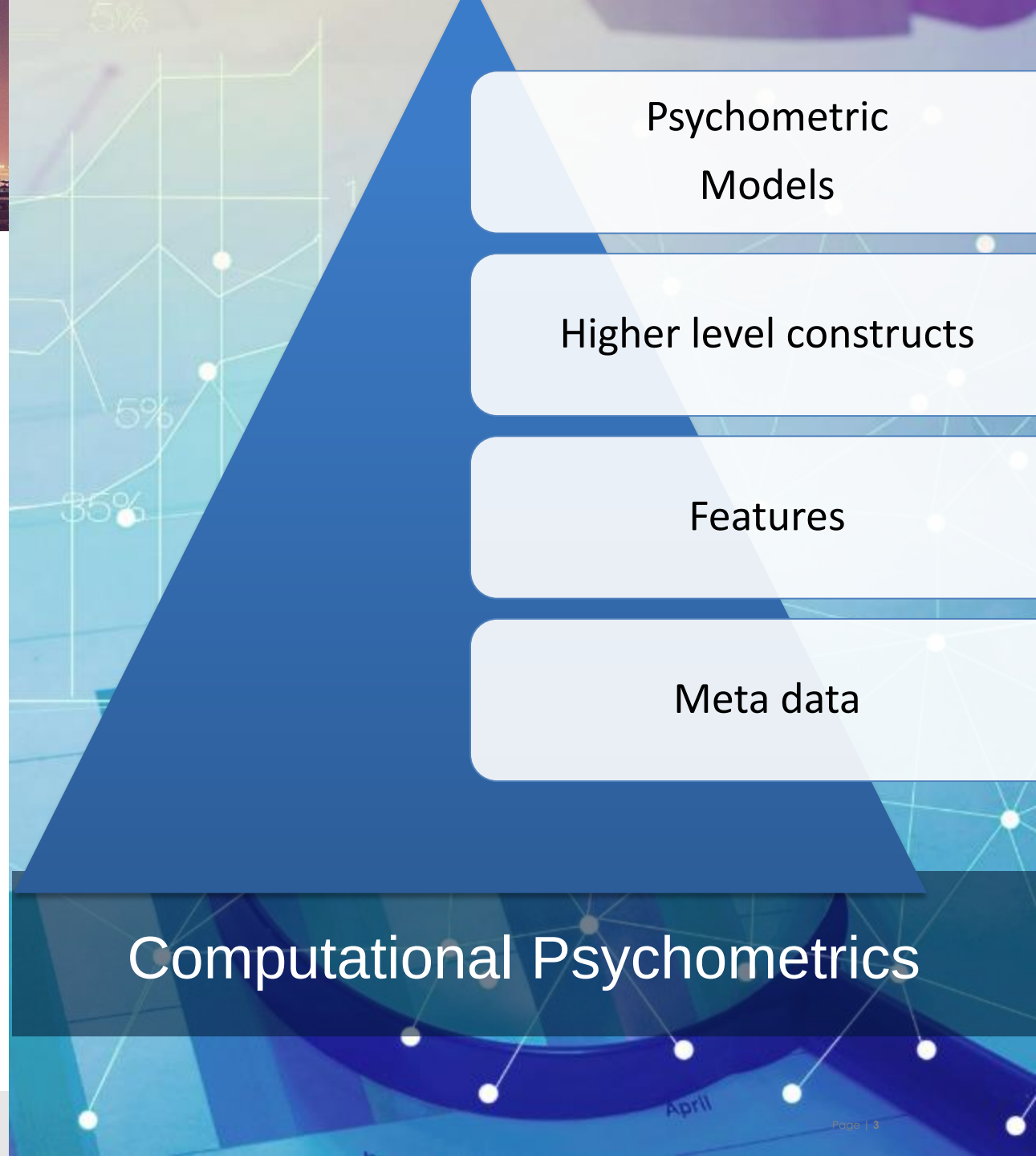
- Modular Learning & Assessment Systems (LAS) in virtual settings
- Cognitive & psychometric theory: Models for how people learn
- Process data: Models for time-dependent data from the process of an educational activity
- Big data (ancillary data): Data mining for pattern identification/knowledge discovery
- In-real time interaction & feedback: Machine learning algorithms for the interactivity
- **Computational Psychometrics!**

Definition

A blend of theory-driven psychometrics & stochastic processes and data-driven & computer science methods (DM & ML) used to measure latent abilities in real time.

- or -

Iterative and adaptive longitudinal hierarchical inference data algorithms embedded in a theoretical psychometric framework.



Challenges

- Privacy
- Sophisticated algorithms that are difficult to understand (Black Boxes)
- A lack of expertise in learning sciences & psychometrics from the computer scientists + a lack of expertise in ML and DM from the psychometricians and learning scientists ➔ Merge disciplines
- Fairness concerns in Big Data
- Rapid ageing of technology

Leveraging Technology and Data to Facilitate Lifelong Learning

Canda D. Mueller, Panelist
Vice President, State Solutions
NWEA

NWEA

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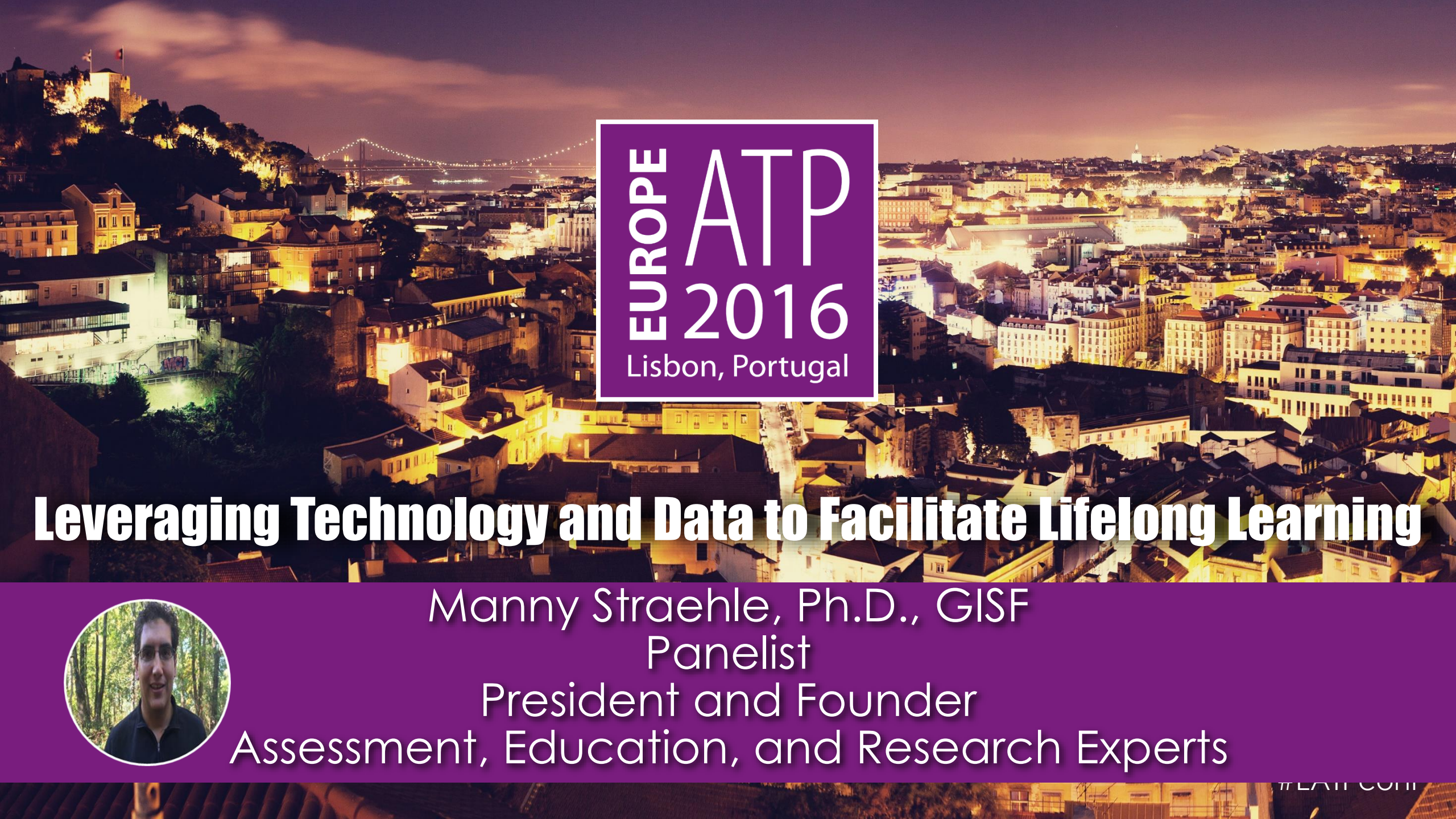
- Advances in policies have changed the way states in the U.S. approach assessment.
  - More collaboration among students.
  - More critical thinking problems.
  - Less time on testing outside of learning.
- But, there are a lot of questions…
- Validity evidence for through-course assessments
  - Does assessing a student on specific material throughout the year provide a strong indicator of future success?
  - What do the results mean for instruction?
- Connections between classroom learning and future phases.
  - What can we do with the information we know from student assessments to encourage future learning?



Leveraging Technology and Data to Facilitate Lifelong Learning

Manny Straehle, Ph.D., GISF
Panelist
President and Founder
Assessment, Education, and Research Experts

Using current advanced technologies

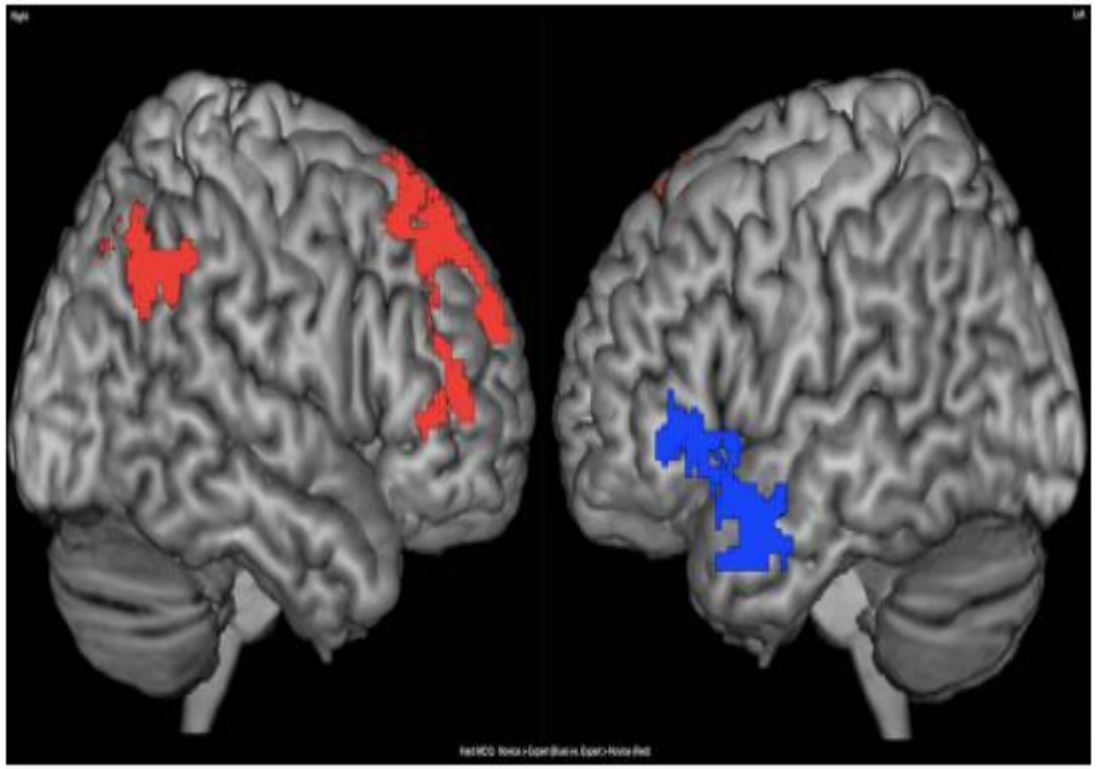
- Mobile Technologies
- Wearable Technologies
- Neurological tools
- Simulations/Virtual Reality/3-D Printing
- Intelligent Data Applications
  - It is not a big data world it is a Big, Medium, and Small Data World
  - Four Vs: Velocity, Variety, Volume, Velocity
  - Smart phone metrics
- Implants and Wireless Brain Communication

More Integrated Assessment Methods Allow More Evidence Claims

- Competence of cognitive KSAs
- Competence of non-cognitive skill
- Difficult constructs to measure
  - Creativity
  - Innovation
  - Critical Thinking
  - Decision Making

EUROPE ATP 2016 Lisbon, Portugal

Does it Work?



UNIVERSITY OF CALGARY

Using functional magnetic resonance imaging (fMRI), researchers show the difference between novice and expert hemispheric differences in decision-making during hard clinical cases. Blue areas show activated areas in novices while red indicate areas for experts.

Leveraging Technology and Data to Facilitate Lifelong Learning

Saskia Wools, Panelist
Manager, Prototyping
Cito

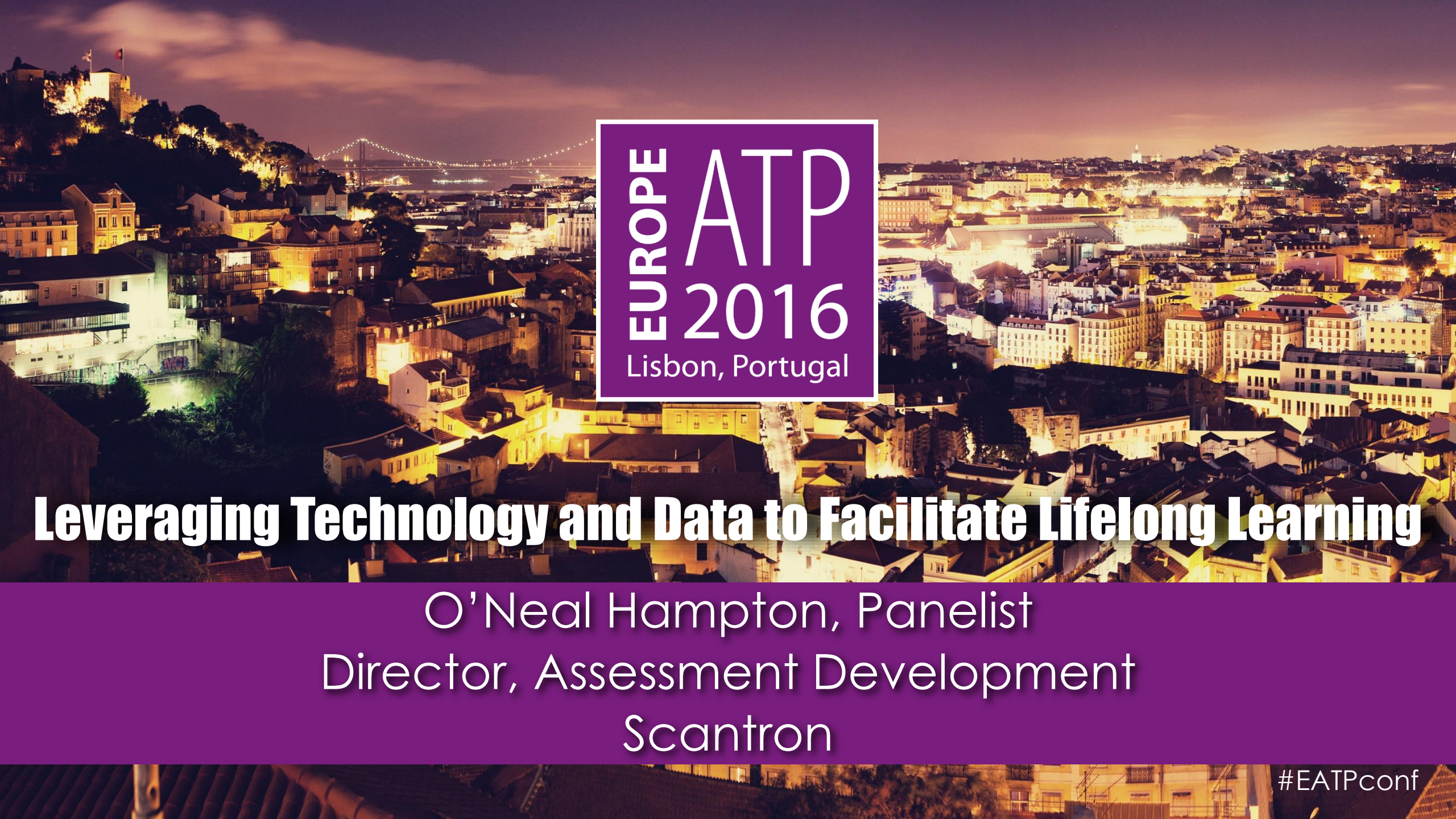
Use (learning) data to support learning and development

- Combining different sources of data
  - From both informal and formal learning,
  - Learning that occurs in different contexts, settings or systems.
- Both measurable and noticeable.
  - Abilities that are learned in school
  - Traits that you developing while at school

How?

Combine four perspectives:

- **Technology** - using open standards to combine data from different sources.
- **Content** – develop complex constructs and valid assessment tasks.
- **Psychometrics** - using and developing models that can be used to analyse and interpret learning and assessment data.
- **Users**(teachers, students) - all users should be able to interpret our data. We need great visualisations.



Leveraging Technology and Data to Facilitate Lifelong Learning

O'Neal Hampton, Panelist
Director, Assessment Development
Scantron

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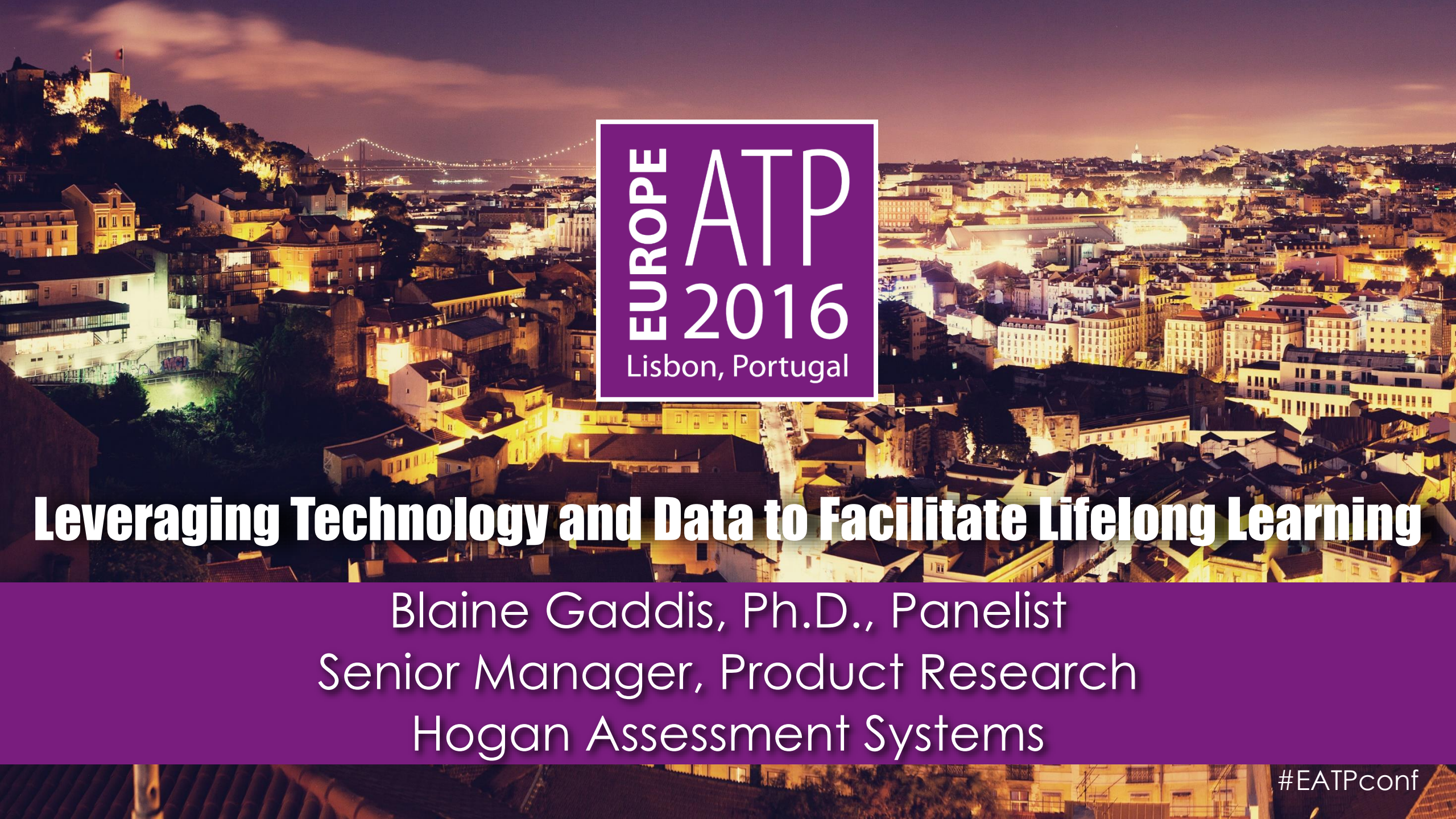
Security Challenges

- Exam security in virtual settings
- Different ages, different security considerations?
- Security challenges for new testing constructs
- Security principles for performance assessments

Privacy Challenges

- Privacy compliance in an ever-changing legislative landscape
- What's after Safe Harbor?
  - Privacy Shield
- Enhanced Privacy considerations in virtual landscapes
- Big Data and Privacy



Leveraging Technology and Data to Facilitate Lifelong Learning

Blaine Gaddis, Ph.D., Panelist
Senior Manager, Product Research
Hogan Assessment Systems

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The Past

- Model
  - Short term & transactional
  - When/what needed for job
- Technology
  - Piles & piles of paper
  - LF simulations
- Data
  - Limited sources
  - Paper exams, reviews
- Methods
  - Universal
- "Lifelong" & "learning" not linked

The Present

- Model
  - Longer term & collaborative
  - Prepare for career path(s)
- Technology
  - Computer-based
  - HF simulations & games
- Data
  - Variety of data sources
  - Multiple perspectives
- Methods
  - People learn in different ways
- "Lifelong" & "learning" now linked

The Future

- Model
  - Real-time
  - Learn & maintain new skills
- Technology
  - Wearables
  - Immediate feedback
- Data
  - Big data!
  - Rethinking data/signals
- Methods
  - Completely individualized
- "Lifelong" & "learning" up-linked!

Leveraging Technology and Data to Facilitate Lifelong Learning

April Cantwell, Ph.D., Panelist
Vice President, Consulting Services
FurstPerson

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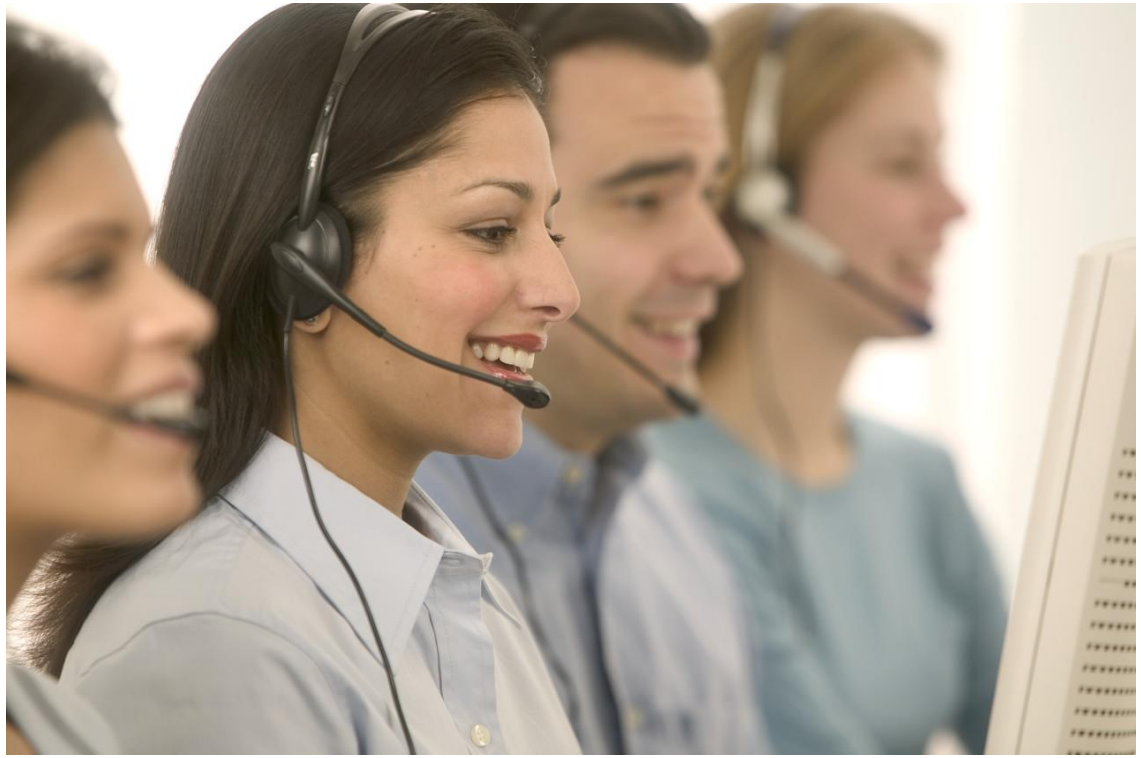
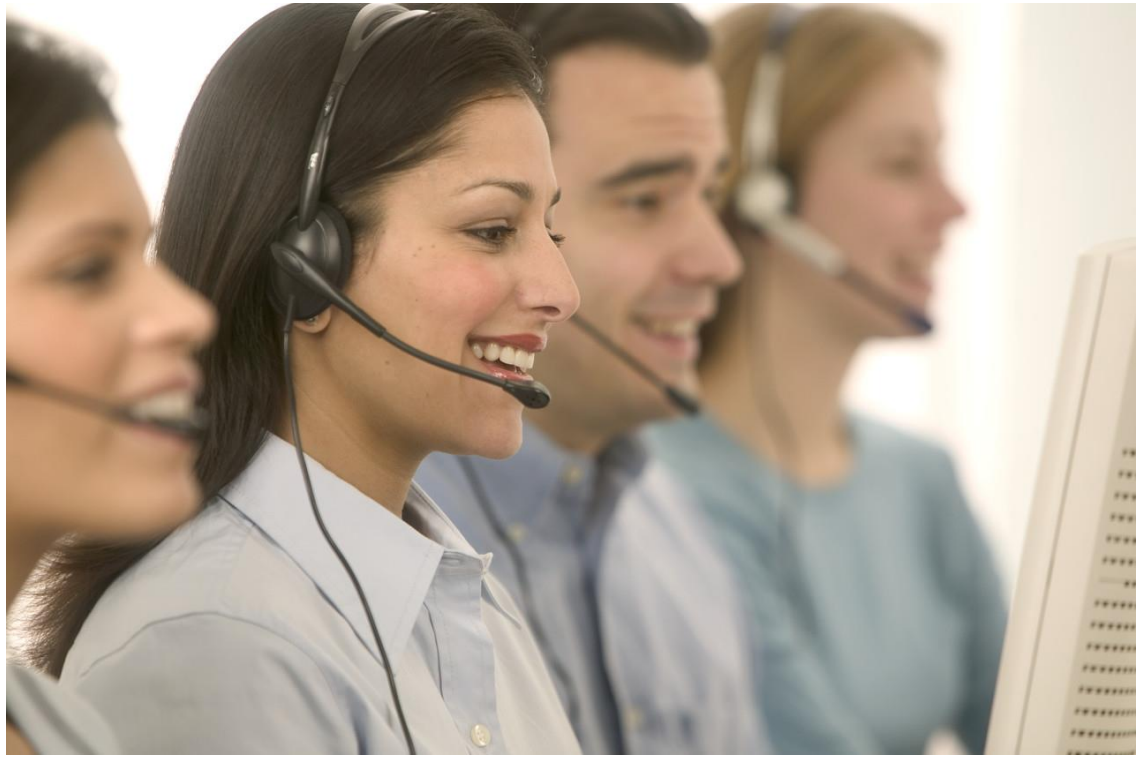
The Context

- Front Line Customer Service



The Context

- Front Line Customer Service
- Cognitive Ability
  - Verbal
  - Math
- Personality
  - Big 5 +1 Model
- Skills
  - Typing, Computer, Data Entry
  - Multitasking
  - Customer Service, Sales



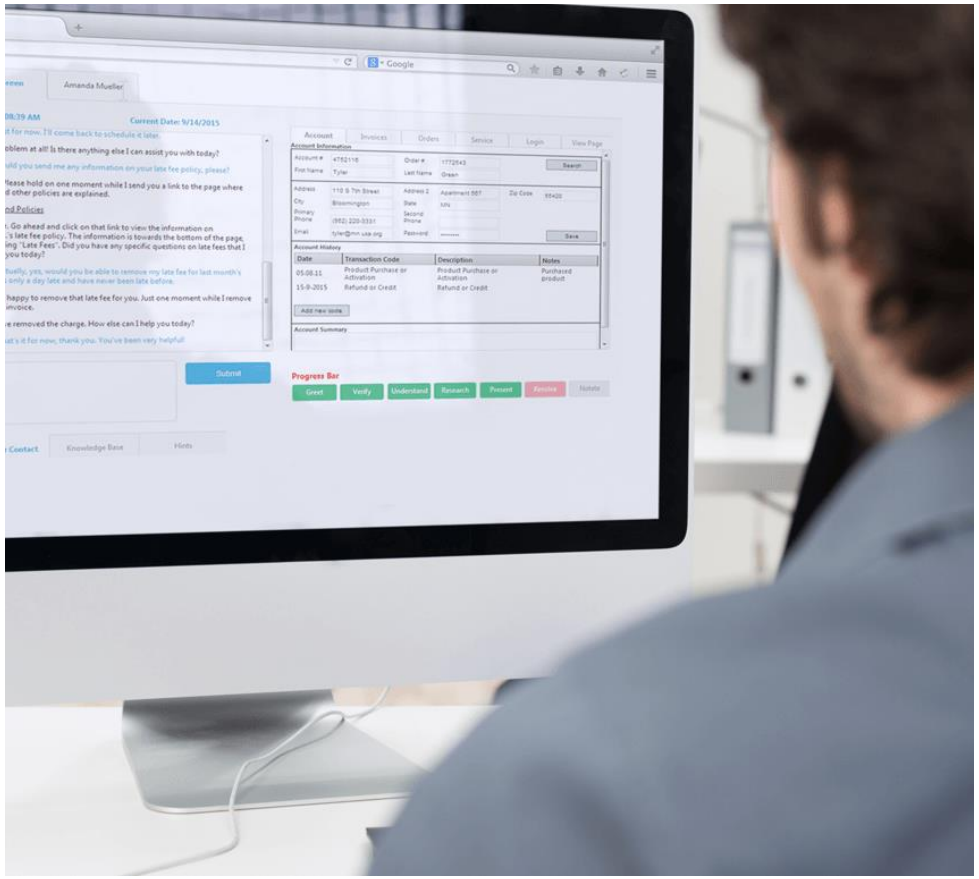
The Challenge

Career Paths

- Other agent roles (Loyalty, Escalations)
- Team Lead, Supervisor Management
- Training
- Quality

The Approach

- Focus on Skills
- Rapid Simulation Builder (RSB)
- Testing, Learning, Testing
  On-the-job Performance



Questions for the Pannelists

- Evidence/Validity Claim
  - What are we going to measure and how do we know we are measuring it?
- Operations/Implementation
  - What are the tools you use to measure and gather evidence?
  - How to collect and leverage Big Data?
- Policy
  - What are the procedures and processes?
- Security
  - What helps in the age of cybersecurity?