

# *Autonomous Vehicles: Understanding the Technology and Identifying Impairment*

**Jeffrey Michael**, Visiting Scholar, Johns Hopkins Bloomberg School of Public Health

**Timothy Brown**, Director of Drugged Driving Research, National Advanced Driving Simulator, University of Iowa

**Kenneth Bragg**, Senior Human Performance Investigator, Office of Highway Safety, National Transportation Safety Board

Moderator: **Garrett Eucalitto**, Program Director; Energy, Environment and Infrastructure; National Governors Association



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# Automation Will Eliminate Impaired Driving!

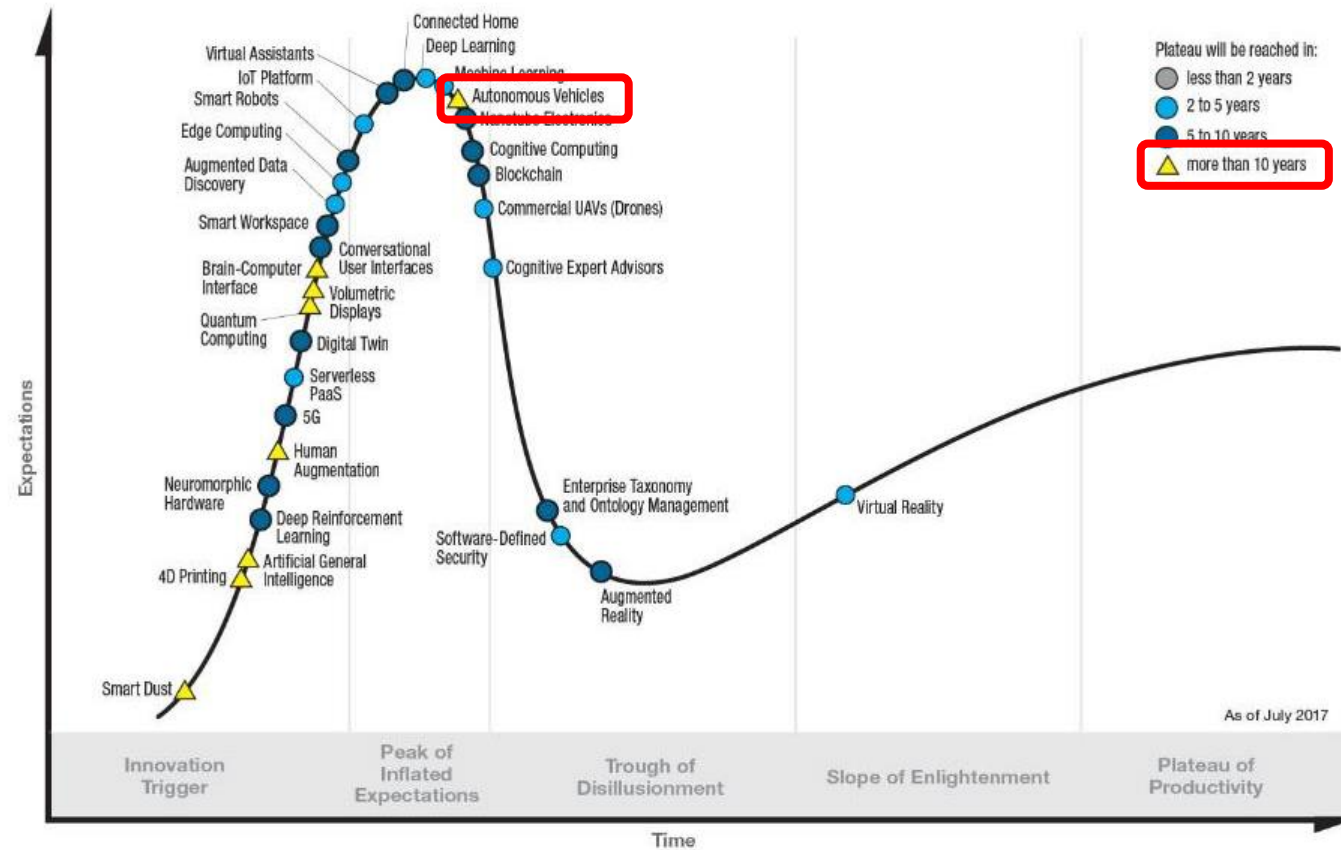
## Right?

Timothy Brown, Ph.D.

31 March 2019

# AVs enter trough of disillusionment

Gartner **Hype Cycle** for Emerging Technologies, 2017



[gartner.com/SmarterWithGartner](http://gartner.com/SmarterWithGartner)

Source: Gartner (July 2017)  
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# Implications for Impaired Driving



**John Lee** @Jdlee888 · Mar 12

The Crash of the Boeing 737 Max Is a Warning for Drivers, Too - Slate. "Robots make excellent backup drivers to humans. Humans make terrible backup drivers to robots."



**The Crash of the Boeing 737 Max Is a Warning for D...**

Pilots usually have to understand their autonomous planes. We should understand our autonomous cars.

[apple.news](https://apple.news)

- As long as Automation may require Human Input, Benefits may be limited
- May Provide a Good Back-up Support

# Implications

- System helps when driver cannot perform adequately
  - Drowsy
  - Distracted
  - Impaired
- System minimizes the need for driver engagement when in autonomous mode
  - Increased safety margins
  - Stopping safely if driver is unable to respond

# TRB Workshop

Drug and Alcohol Impairment: Challenges for Automated Vehicles

# Challenges Needing Research

## **Detecting Impairment**

- Vehicle Detection of Impaired Driver
- Behavioral Test for Impairment Similar to SFST
  - How do you know a driver is impaired if vehicle is in automated mode?

## **Too Impaired**

- Minimum thresholds for drugs where impairment would affect response

## **AV Crashes**

- Minimum thresholds for drugs where impairment would affect response



# More Challenges

## Reliance

- Do drivers understand capabilities and limitations
- Does learned behavior need to adapt to automation
- Are people willing to rely on AVS to get them home safely if they plan on drinking/using drugs?

## Mitigation

- Staged intervention
  - Take control or stop if driver is impaired?
- Does the system report if driver is impaired
  - If so, to who?

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