

## TOOLS AND TECHNOLOGY FOR PRACTITIONERS: GIVE BIG AG TREANDS

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### Outline:

It's a time of exponential change in our society and in the industries that heat and light our homes, transport us, entertain us, and feed our families. This is also true in agriculture and closely allied industries! What does exponential change and growth really mean? First, linear growth means adding a fixed amount of "something" every time period. Like a year. If I invest \$10,000 in the stock market and it grows only by a fixed, linear rate of \$1,000 a year, after 25 years, I will have \$34,000. Not bad. But, if I invest that same \$10,000 and grow the balance by 10% per year, compounding last year's gain on top of this year's, I will have \$98,497 after 25 years. Compound interest is an example of exponential growth that we're all familiar with.

Technology and SPECICALLY, computing power, has been growing in this exponential way since the 1950s. But, computing power doesn't grow by single digits as is the case with investing money in a savings account. "Moore's Law," named after an early computer pioneer, tells us that computing power doubles approximately every 12 to 18 months. That means the annual growth rate is close to 100%! We will talk about what this means for all of us in the conference session.

Nearly all of us at the Wisconsin Agribusiness Classic carry in our pockets a computer that has more power than all of the computers that NASA used to send Neil Armstrong to the moon in 1969. It's called a smartphone. Computer performance is often measured in units called "FLOPS" which is FLoating-point Operations Per Second. To show how quickly things have advanced, in 1961, an early high-speed computer would have theoretically cost \$8.3 trillion to perform one "gigaFLOPS," or one billion calculations per second. In 2013, the Sony PlayStation 4 videogame console (actually a computer) performed calculations that allowed users to play graphics-rich games (like Call of Duty) at a cost of 22 cents per one gigaFLOPS. And, today, a modern \$500 laptop computer has that cost down to 8 cents! That's the power of exponential growth. Looking at things another way, my Apple 6 iPhone has a graphics processing unit that would have cost \$637 trillion in 1961 to have the same computing speed and power.

In this session, we will talk about four major future trends brought about by these technology capabilities. I will also talk about a 5th major trend that we see at places like university ag colleges and a trend that will continue to shape agriculture in Wisconsin, and across the globe. To learn about the fifth one, you will need to attend the session. These are:

### Number 1. Big Data (and, not so big data)

- Driven by new data collection devices, platforms, and systems
  - Drones and UAVs (yes, they are super cool, but they largely now serve as data collection devices)
  - Sensors
  - Internet of Things

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- Also enabled by super-cheap data storage technologies (including cloud).
- If we are not able to figure out high speed mobile access and “broadband” coverage, some areas of our state are going to be left behind.
- Questions about data security, ownership, effect on land and other asset values.

#### **Number 2. Artificial Intelligence**

- Think SIRI, Alexa, and J.A.R.V.I.S. (see Iron Man).
- Healthcare and other bio-applications.
- Watson-style computers (now the size of five pizza boxes) comb EVERY one of the 700,000+ cancer-related journal articles published each year – the average cancer doc only has time to read 200. Computers (and AI) are suggesting new treatments for complex cases that docs cannot find an answer to or that might take months.
- The same potential capabilities exist in agriculture (in the future) – with a dire warning.

#### **Number 3. Autonomous Vehicles – Cars, Semis, Tractors & Other Robotic/UAV Applications**

- Google, Tesla, several U.S. and international companies are leading the way.
- This technology will be here before you know it – safety is the concern (now), but will ultimately be the major selling point.
- Will also see applications in truck transportation systems.
- Biggest delay will not be the technology – it will be regulation and insurers.
- Autonomous tractors – the talk of the 2016 Farm Progress Show.

#### **Number 4. Sharing and Collaborative Economy Business Models**

- For those who travel, think AirBNB, Uber, and VRBO.
- Doubling utilization of a \$500,000 machine that’s only used 5-7% of time might make sense.
- Also includes crowdfunding, freelance workers (sites like UpWork)
- What about a car/tractor/manufacturing machine “parts” center that shares a 3-D parts printer?
- Enabled by technology, apps

#### **Number 5. Changes in Agriculture’s Future Leadership and Workforce**

- Show up to learn more!

#### **Some other things that did not make it into this list (just not enough time!):**

- 5G wireless (5G is not just 1G better!)
- 3D printing (even of specialized foods and medicines? – yuck)
- Virtual and augmented reality
- Changing consumer demands – information and “the story”
- Big-time concerns about science literacy, risk perception
- Population trends and demographics in parts of Wisconsin (and, some of the causes)
- How do we go “high- tech” without losing the high-touch connectedness, community, and personal touch we see in Wisconsin agriculture?
- How do we capture the cool-factor to engage the generations who will follow us?