Questions to be addressed:

* The most interesting case studies of applied analytics that our panelists have been involved with
  + Lapse risk predictive modeling in life insurance
  + TPC: Fatality and Injury Predictive Modeling from Collision Data
  + Healthcare:
* Is it all machine learning, AI, and coding?
  + The short answer is No.
  + The ML/AI and coding are means to an end which is solving a business/research/policy problem.
  + The coding piece is reducing thanks to advanced tool boxes (e.g [Dataiku DSS](https://www.dataiku.com/dss/features/connectivity/), Microsoft Azure ML Studio, [Orange Data Mining](https://orange.biolab.si/))
  + Analytical skills: Framing the problem, asking the right questions are equally important as appropriate ml/ai techniques and how you implement/code those technique.
  + Business Savvy: Serving a business goal is another corner stone that has crucial importance.
  + One must be able to find a business need, apply the analytical skills, ML methods and coding.

* Does the data have to be big? and what is "big data" anyway?
  + The short answer is no … 😊
  + Big data does provide a promise for having a larger, more connected and coherent picture of reality. However, just the size doesn't matter without meaning.
  + Meaningful data [that carries enough information about phenomena/process/reality] is more important.
* What background is most suitable for data science?
  + Individuals can enter this field from a variety of different angles.
  + Data Scientist job requires a robust skill set touching Statistics, Mathematics [Core AI and ML], Computer Science [Applied].
  + Other background would need to invest time and effort to build up the basic knowledge base in above mentioned.

* What is the need for statisticians? mathematicians? operations research specialists?
  + Statisticians & Mathematicians:
    - characterizing the data
    - design and analysis of the ML algorithms
  + operations research
* How essential are skills in SAS, SQL, matlab, python, and r ?
  + General Answer: Tools to implement, productize and maintain solutions are not less important than theoretical understanding of how machine learning algorithms are derived, extended and specialized.
  + SAS is an Analytics Software Solutions provider aiming at providing general purpose Data Management, Statistical Analysis, Visualization and Modeling tools
    - A very useful skill to have with many industrial applications and support
  + SQL: Structured Query Language is a high-level Relational Database query language
    - An important skill to query and extract relevant information from structured databases.
  + Python and R are programming/scripting languages
    - Both come handy in implementing customized ML/AI problems where ready-made tools and studios fall short (e.g. SAS)

* What are the new “must have” skills?
  + Technical Skills
    - Programming: R, Python, Java
    - Data Management: Structured (SQL), Unstructured (NoSQL)
    - Parallel & Distributed Computing: Hadoop / PIG / Hive / Spark
    - Visualization: Conveying the story to audience
    - Analytical Tools: SaS, ML Studio etc
  + Non-Technical Skills
    - Ability to keep oneself abreast of the new developments in deep learning and keeping in touch with cutting edge research results
    - Ability to identify the business opportunities where data driven insights can lead to growth and efficiency
    - Communication and story-telling skills
    - Intuition and Insight Discovery
  + Depending on the DS process phase:
    - Data Management
    - Modeling
    - Deployment
    - Domain Knowledge: ML works only in well defined, well understood problems
* Is a graduate degree a must?
  + Yes. But not sufficient. Build an online portfolio of projects
* Are data science bootcamps replacing graduate degrees to get people into the field quickly?
  + A graduate degree in Mathematics, Statistics, Computing is necessary prerequisite without which topics in data science would not be understandable.
  + Therefore, bootcamps and certificate programs can brush up and tune the knowledge-base in addition to providing an introductory experience into the tools but they cannot replace.

* How is data science different than data mining? business intelligence? analytics?
  + It is at the intersection of multiple disciplines.
  + Data Analysis: A human process of finding hidden patterns and str
  + Analytics: Automating the analysis process
* How does/should data science fit into an organization?
  + Sectors:
    - Online Service: Netflix
    - Manufacturing: Anomaly Detection, Pre-emptive Crisis Management
    - Retail: Consumer Analytics, Supply Chain Management, Loyalty Management
      * Key Performance Indicators (KPIs) of business
      * Customer lifecycle
        + Engagement and Retention

Individualized product/service offering based on customers history preferences (recommendation systems)

* + - Operations Efficiency
    - Agriculture:
    - Medicine:
  + DS Adoption Phases:
    - Introduction
    - maintenance
    - scaling
  + IT-Centric DS initiatives:
    - DS is composed as a component of IT Department
    - MLaas (ML as a Service) Approach
      * Economical
      * Commodification of ML by Google, Amazon, Microsoft elevates the need to have private infra and expertise
      * Fast training and easy deployment and maintenance of models
  + Integrated DS Initiative
    - DS and IT are loosely-coupled, interdependent staff
    - DS team prepare data, train models
    - IT incharge of interfaces, and infra to deploy and service the models
    - Advance ML tools (TensorFlow, Theano)
    - Highly specific business problems that need custom-built solutions
  + Dedicated DS department
    - Highest cost: infrastructure & talent (acquisition, engagement, retention)
    - Specialized DS teams for different business units (Security, Customer Analytics, SCM)