Earth Science Data Analytics/Science Skills Needed: Overall Experiences /Operational Needs

**Data Analytics / Data Science**
- Need skills in: mathematics, numerical modeling, statistics, software engineering and the ability to integrate data across multiple domains.
- Need expertise in tools and techniques: rule learning, classification, cluster analysis, data fusion, machine learning, neural networks, anomaly detection, modeling, time series analysis, visualization.
- Need knowledge in particular science domains where data analytics can advance our understanding of science.
- The role is a hybrid one... skills to support domain scientists with data and computational needs to communicate across domains.

**Operational Needs**
- Need to facilitate making data more useful.
- Should be interdisciplinary from the start.
- Learn your math and statistics.
- Know the importance of the data lifecycle.
- Understand what the data says and how to understand the data.
- Know the territory: What information is available? Where to get it? How it is generated? How to use it? How it can be used.
- Understand data, metadata, and data integration.
- Know how to apply the techniques to the discipline.
- Learn through internships.

**General Experiences**
- Need skills in: mathematics, numerical modeling, statistics, software engineering and the ability to integrate data across multiple domains.
- Need expertise in tools and techniques: rule learning, classification, cluster analysis, data fusion, machine learning, neural networks, anomaly detection, modeling, time series analysis, visualization.
- Need knowledge in particular science domains where data analytics can advance our understanding of science.
- The role is a hybrid one... skills to support domain scientists with data and computational needs to communicate across domains.

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**What the Universities Offer (July, 2016 study and comparison with 2013 Study)**

**Program Focus Areas**

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<th>Program Focus Areas</th>
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**Earth Science Data Science: Preparing for Extracting Knowledge from Information**
Steve Kempeler1, Lindsay Barbieri2
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