ModSim Teams: Data-driven multidisciplinary teams solving 21st century challenges

Jeff Segall  MA, MBA
CEO, Founder   Inflow Interactive LLC

- Enterprise perspectives
  - Data talent challenges: A threat to M&S?
  - Need for multidisciplinary teams
- New leadership opportunities for M&S
"To succeed at an analytical competitor, information workers and decision makers need to become adept at three core skills:

- **Experimental** (design valid tests)
- **Numerate** (interpretation of results)
- **Data literate** *(modeling, simulation and visualization)*

Data-Science-Analytics Talent Pipelines

<table>
<thead>
<tr>
<th>Analytics Semi-Professionals</th>
<th>Analytics Professionals</th>
<th>Data Scientists</th>
</tr>
</thead>
<tbody>
<tr>
<td>MBAs, business analysts, supply chain analysts, market researchers</td>
<td>Advanced degrees in statistics, econometrics, mathematics, physics, operations research</td>
<td>Masters or PhD. in applied analytics, informatics, data science</td>
</tr>
</tbody>
</table>

“By 2020 the number of DSA job listings is projected to grow by nearly 364,000 listings, to about 2,720,000 openings.

If McKinsey’s predicted supply of 2.8 million analytically savvy workers is accurate, then nearly every one of these workers must change jobs annually to fill open DSA positions.”¹

Chasing the Unicorn...

Data Scientists Follow the Money
(and technical challenges)

Data Scientist: The Sexiest Job of the 21st Century
by Thomas H. Davenport and D.J. Patil
FROM THE OCTOBER 2012 ISSUE

Data scientists today are akin to the Wall Street “quants” of the 1980s and 1990s.
## Converging Mod/Sim and Data Science Skills¹

<table>
<thead>
<tr>
<th></th>
<th>Statistics</th>
<th>Computer Science</th>
<th>Data Viz</th>
<th>Typical Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Instructional Design</strong></td>
<td>1</td>
<td></td>
<td>1</td>
<td>Learning Evaluation</td>
</tr>
<tr>
<td><strong>MBA</strong></td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>Product/profit, optimization</td>
</tr>
<tr>
<td><strong>HR – People Analytics</strong></td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>Engagement, productivity, performance modeling</td>
</tr>
<tr>
<td><strong>Data Analysts</strong> (OR, statistics, informatics)</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>Reporting, optimization, predictive modeling</td>
</tr>
<tr>
<td><strong>Data Scientists</strong> (PhDs, MS Data Science)</td>
<td>3</td>
<td>5</td>
<td>4</td>
<td>Explore complex data types, HPC, prescriptive modeling, machine learning, AI</td>
</tr>
<tr>
<td><strong>Modeling &amp; Simulation</strong></td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>Algorithms, HPC, model complex data types, engineered systems</td>
</tr>
</tbody>
</table>

1 Informal review of MS curricula prerequisites for Mod/Sim and Data Science

© Jeff Segall, Inflow Interactive LLC 2017
“We found a fundamental disconnect. Employers will need data-driven, multidisciplinary teams to tackle their biggest problems and grasp their most promising opportunities.”

“Competency in data science includes the ability to thrive in multidisciplinary teams…Educators need to provide a program that brings industry, policy makers, computer science and data science together through a diverse range of skills, expertise and experience.”
Using IoT Sensors to Enhance Simulation and Training in Multi-team Systems¹

“When multi-team systems act without any prior training focused on the entire system...there is increased risk of information not being handed off efficiently or correctly, and teams competing instead of collaborating.

Behavioral data analytics can play a key role in making multi-team systems training possible.”

1. Brenda Bannan, Jeff Segall, et. al. I/ITSEC 2017 paper No. 17064, p. 11

® Jeff Segall, Inflow Interactive LLC 2017
“IoT analytics developers have been brewing sensor data skills for over a decade. Every day, data integration developers wrangle sensor data into usable data. And every day, data scientists distill sensor data into ROI.”

Dan Graham,
GM Enterprise Systems, Teradata

---

2. How can organizations close the IoT skills gap? Internetofbusiness.com  2/13/2017
Cybersecurity and Modeling Needs for IoT and Smart Cities

DHS, NIST to jointly sponsor Global City Teams Challenge for “smart city” solutions in 2018

Tuesday, August 29, 2017 by Alex Murtha
Federal IoT market grew 20% in FY2015 to over $9 billion annualized.

Sensors growing at 56% a year to $4.1 billion, driven chiefly by defense technologies¹

“Those organizations with analytics capabilities that are good or excellent are three times more likely to report having no trouble getting business value from IoT.”

MIT Sloan Management Review
M&S at the Core
Data-Driven Multidisciplinary Teams

Modeling & Simulation

Pre-hospital Emergency Response
911, Ambulance, Fire

Hospital ER

Sensors + Data Analytics

HR – People Analytics

Smart Cities
Health Care

IDs
MBAs

Cyber Security
Disaster Response

© Jeff Segall, Inflow Interactive LLC 2017
Focused Support for Multidisciplinary Teams

Stanford D-school

Columbia University Data Science Institute
Envisioning...

ModSimTeam School

• ‘MoST School’ – immersive, multidisciplinary seminars solving local/regional problems

• **M&S holds a core leadership role**
  – Builds pipeline of M&S capable teams

• Data analytics skills are the bridge
  – M&S strengths in IoT sensors and physical systems
  – Easing the data analytics talent shortage

® Jeff Segall, Inflow Interactive LLC 2017
InFlow Interactive LLC enhances workforce capabilities via rapid prototyping of workforce analytics, simulations and embedded performance support solutions.