


**Effective Collaboration  
between Actuaries and  
Data Scientists**

CAS Ratemaking, Product and Modeling Seminar  
March 25-27, 2019



---

---

---

---

---


---

---

---

**Live Polling**

**Live Polling will be used. Please navigate to  
this session in the CAS app or open the  
webpage link in the Live Stream.**



---

---

---

---

---

---


---

---

**Introductions**

**Jeff Stoiber** FCAS MAAA CSPA  
MS in Statistics

**Gus Theofanis**  
MS in Statistics



---

---

---

---

---

---

---

---

### Audience Poll

#1 We should build the model from scratch


#2 We should build upon what we have in place today

A Ideal state is 1; my organization's approach is 1

B Ideal state is 1; my organization's approach is 2

C Ideal state is 2; my organization's approach is 1

D Ideal state is 2; my organization's approach is 2



---

---

---

---

---

---

---

---

### Audience Poll

#1 Use whatever modeling software gets the job done


#2 Use trusted external software, and internal applications

A Ideal state is 1; my organization's approach is 1

B Ideal state is 1; my organization's approach is 2

C Ideal state is 2; my organization's approach is 1

D Ideal state is 2; my organization's approach is 2



---

---

---

---

---

---

---

---

### Audience Poll

#1 Not all models need to be explained


#2 If you can't explain a model, you can't use it

A Ideal state is 1; my organization's approach is 1

B Ideal state is 1; my organization's approach is 2

C Ideal state is 2; my organization's approach is 1

D Ideal state is 2; my organization's approach is 2



---

---

---

---

---

---

---

---

## Agenda

- Collaborative Data Science
- Analytical Organization at State Farm
- Benefits of Collaboration
- Challenges of Collaboration
- Q&A





---

---

---

---


---

---

---

---


## Data Scientist – How to Define?



**Statistics on a Mac**

Josh Wills, Dir. of Data Eng. at Slack

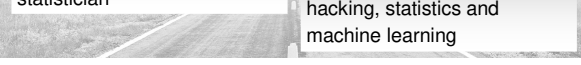

Person who is better at statistics than any software engineer and better at software engineering than any statistician



**Data Analyst that lives in California**

Hillary Mason

...someone who can obtain, scrub, explore, model and interpret data, blending hacking, statistics and machine learning


---

---

---

---

---

---

---

---

## Audience Poll



What is the most important skill for a data scientist?

**A** Data Wrangling

**C** Statistical Knowledge

**B** Data Visualization

**D** Feature Engineering


---

---

---

---

---

---

---

---

## Data Scientist – How to Define?

**Data Scientist Skillset:**

- ✓ Statistical Modeling
- ✓ Machine Learning
- ✓ Data Warehousing
- ✓ Big Data Tools
- ✓ Data Visualization
- ✓ Application Development
- ✓ Strong Communications
- ✓ Business Knowledge

State Farm 10

---

---

---

---

---

---

---

---

## State Farm R&D Center

- Collaborative Environment
- Applied Experience
- Idea Incubator
- Talent Pipeline

State Farm 11

---

---

---

---

---

---

---

---

## Example – Talent Development

**Competitive Standing**

- Retention
- Telematics

- ✓ Logistic Regression
- ✓ Random Forests
- ✓ Neural Networks

State Farm 12

---

---

---

---

---

---


---

---

### Audience Poll

How many data science professionals are employed in your company?

A	0-4	C	25-49
B	5-24	D	50+



---

---

---

---

---

---


---

---

### Analytical Organizations at SF

Hybrid based centralized/decentralized structure

P&C Actuarial	P&C Underwriting	Advanced Analytics / Data Science
<ul style="list-style-type: none"><li>Model development for pricing</li></ul>	<ul style="list-style-type: none"><li>Model development for underwriting</li></ul>	<ul style="list-style-type: none"><li>Model development for rest of enterprise</li><li>Data Governance and maturation of advanced analytics for the enterprise</li></ul>



---

---

---

---

---

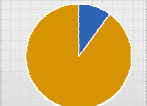
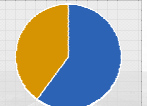

---

---


---

### Analytical Organizations at SF

Hybrid based centralized/decentralized structure

P&C Actuarial	P&C Underwriting	Advanced Analytics / Data Science
		

Actuaries (yellow)  
Data Scientist (blue)



---

---

---

---







---


---

---

---

### Data Scientist – Integration Strategy

Functional Teams	 Actuaries	<b>Core Strengths</b> Loss projections Loss reserving Business of Insurance Business Statistics	
	 Data Scientists	Statistics Machine Learning Coding	
Cross-Functional Team	 Collaborative Data Scientists	Loss projections Loss reserving Business of Insurance Statistics Machine Learning Coding	



---

---

---

---

---

---


---

---

### Audience Poll

Do actuaries and data scientists collaborate in your company?

- A** No Collaboration to date and none planned
- B** No Collaboration to date but plans are in the works
- C** Some collaboration based on projects
- D** Data Scientists and Actuaries are embedded together



---

---

---

---

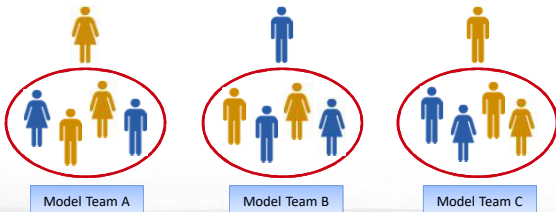
---

---

---


---

### Example – Collaborative Model



Model Team A      Model Team B      Model Team C

**“Difficult to tell where one role begins and another ends.”**



---

---

---

---

---

---

---

---

### Benefits of Collaboration

- Diversification of thought
- Project Management best practices
- Increased creativity
- Alternative Communication Strategies
- Increased "toolbox"
- Multidepartment advocacy

State Farm 19

---

---

---

---

---

---

---

---

### Challenges of Collaboration

- Terminology
- Software
- Computing Environments
- Different Strategies

State Farm 20

---

---

---

---

---

---

---

---

### Lessons Learned

- No I in team
- Development Opportunities
- Different World Views

State Farm 21

---

---

---

---

---

---

---

---

**Conclusion**



One Size ≠ All

(De) Central

Teams Powerful, Collab Even More



---

---

---

---

---

---

---

---

**Questions**





---

---

---

---

---

---

---

---