

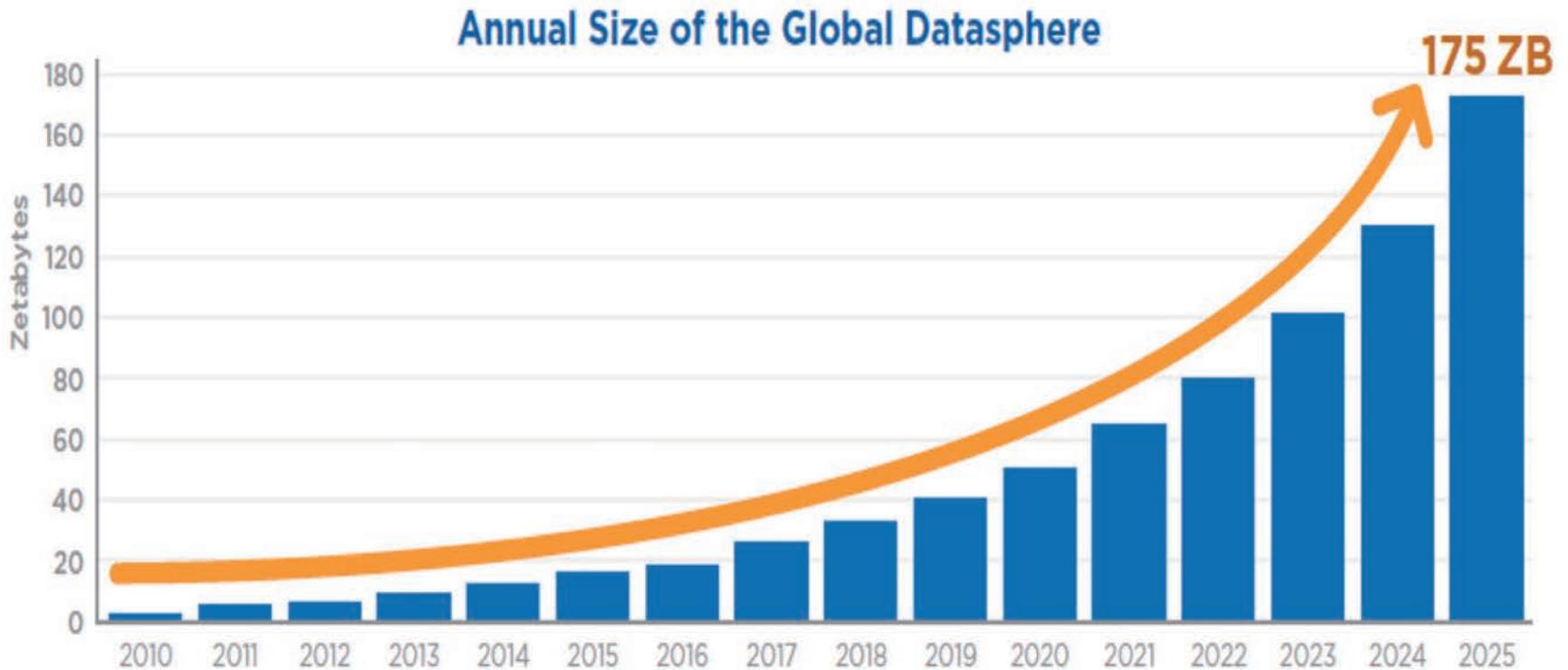
MASTER OF SCIENCE IN ANALYTICS

The Employer Is The Customer and The
Need for Practical Experiential Education

Christopher J. West, PhD
Practicum Manager
Institute for Advanced Analytics
North Carolina State University



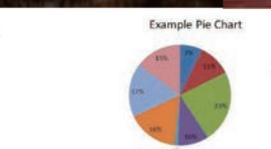
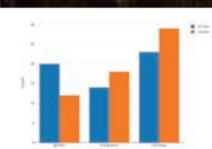
Data “Problem”



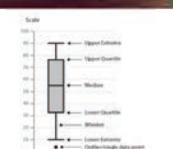
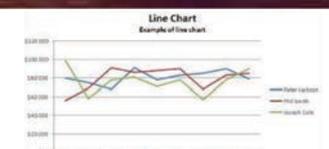
Source: Data Age 2025, sponsored by Seagate with data from IDC Global DataSphere, Nov 2018

*IDC *Digital Universe*





- Red
- Blue
- Green
- Yellow
- Purple
- Orange
- Grey



Example text block containing several lines of small, illegible text.





AT SCALE!!!



Volume Velocity Variety Validity...







- ❑ PhD in Computer Science or Statistics
(actually both are preferred)
- ❑ Master of Business Administration
- ❑ 10 years successful professional
experience
- ❑ Coding, Communication, Leadership...



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WILL NOT SCALE!!!

Data
Driven Results



New Employees

Data
Driven Results

Analytical
Techniques?

New Employees

Institute for Advanced Analytics

- The Master of Science in Analytics (MSA) degree offered by the IAA at North Carolina State University was designed for this purpose.
- This degree was designed on the most basic business principle...

LISTEN TO YOUR CUSTOMERS!
(THE EMPLOYERS)



Job Description

We are seeking a highly motivated **Senior Marketing Research Analyst** for our Business Analysis division to develop and present insightful and innovative solutions for a top fast moving consumer goods manufacturer located in the Richmond, VA area. The selected candidate will train at MSA's headquarters in Pittsburgh, PA for a period of three to six months. After which, the selected candidate will begin working on-site at the client location on a full-time basis, with occasional trips back to Pittsburgh to meet with the core team.

The successful candidate will become an integral part of the client's analytics group, forging successful client relationships as well as providing value-adding business insights. The new hire will also proactively seek additional business opportunities for MSA to provide to the client. Qualified candidates must possess an analytical background coupled with strong business acumen. Additionally, solid communications skills are required for articulating business recommendations based on quantitative modeling and techniques. The candidate will be required to utilize statistical packages such as SAS and SPSS to manipulate and integrate all germane data sources, as well as perform the statistical modeling.

Required Skills

- Requires BS/BA in quantitative business, math, statistics, economics or equivalent experience
- MBA degree or MS in Statistics may substitute for one year of experience
- Minimum three years related experience
- Knowledge of statistics, mathematics and marketing required; business exposure highly desirable
- The person must be knowledgeable of different quantitative research techniques and familiarity with various data sources preferred
- High level of comfort and skill with statistical packages (knowledge of SAS desirable) and Microsoft Office products essential
- Ability to translate analytical results to business implications is essential
- Previous experience with project management and leading small project teams
- Ability to effectively interact with clients
- Excellent written and oral communication skills
- Good interpersonal and team skills
- Ability to multi-task is essential



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Data
Driven Results

Analytical
Techniques?

New Employees

The diagram consists of three blue shapes with black outlines. At the top is a large blue triangle pointing upwards, containing the text 'Data Driven Results'. In the center is a vertical blue rectangle containing the text 'Analytical Techniques'. At the bottom is a horizontal blue rectangle containing the text 'New Employees'. The shapes are arranged vertically, with the triangle at the top, the rectangle in the middle, and the rectangle at the bottom.

Data
Driven Results

Analytical
Techniques

New Employees

Data
Driven Results

Communication

Teamwork

Analytical
Techniques

Computing

Practical

New Employees

Data
Driven Results

Practical

Computing

Analytical Techniques

Communication

Teamwork

New Employees

Institute for Advanced Analytics

The MSA is ***not***...

- **a prelude to a doctorate degree**
- theoretical in focus
- a research or teaching assistantship program



Institute for Advanced Analytics

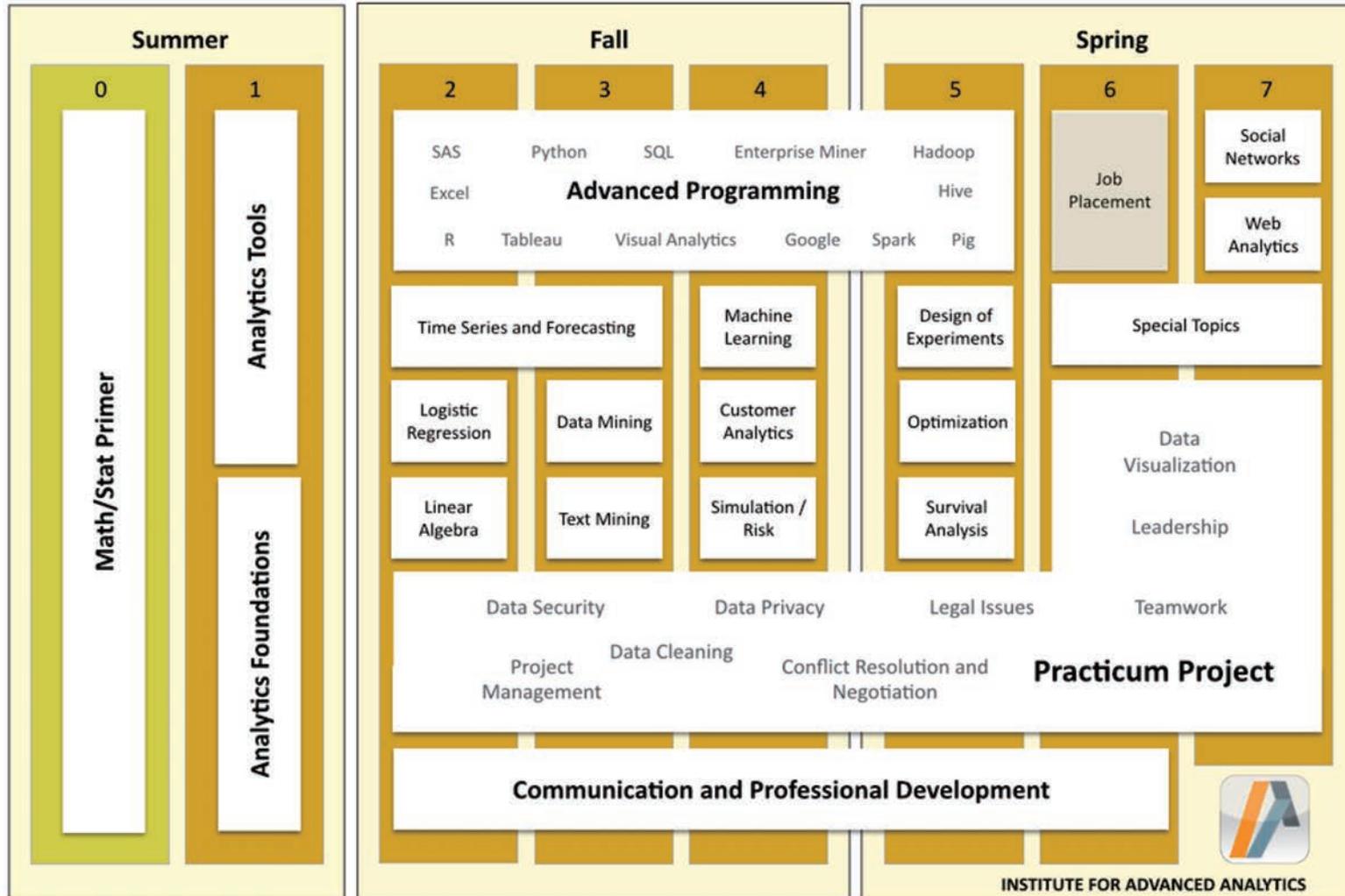
The MSA is...

- quick to complete (less than one year)
- demanding (M – F, 9 – 5, business casual/formal)
- cohort-based
- practical
- challenging
- learning by doing (**Practicum Project**)



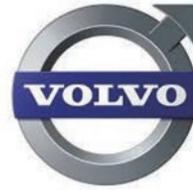
Aggressive Curriculum

MASTER OF SCIENCE IN ANALYTICS 2017-18



Practicum Project

8-months, 4-5 Students,
No Fee, Confidential, Industry Standard Tools,
Executive Presentation, Report, +, +,



JOHN DEERE

SIEMENS



EASTMAN



THE NORTH FACE

NORTHROP GRUMMAN



United Airlines



ESTÉE LAUDER

MetLife



at&t

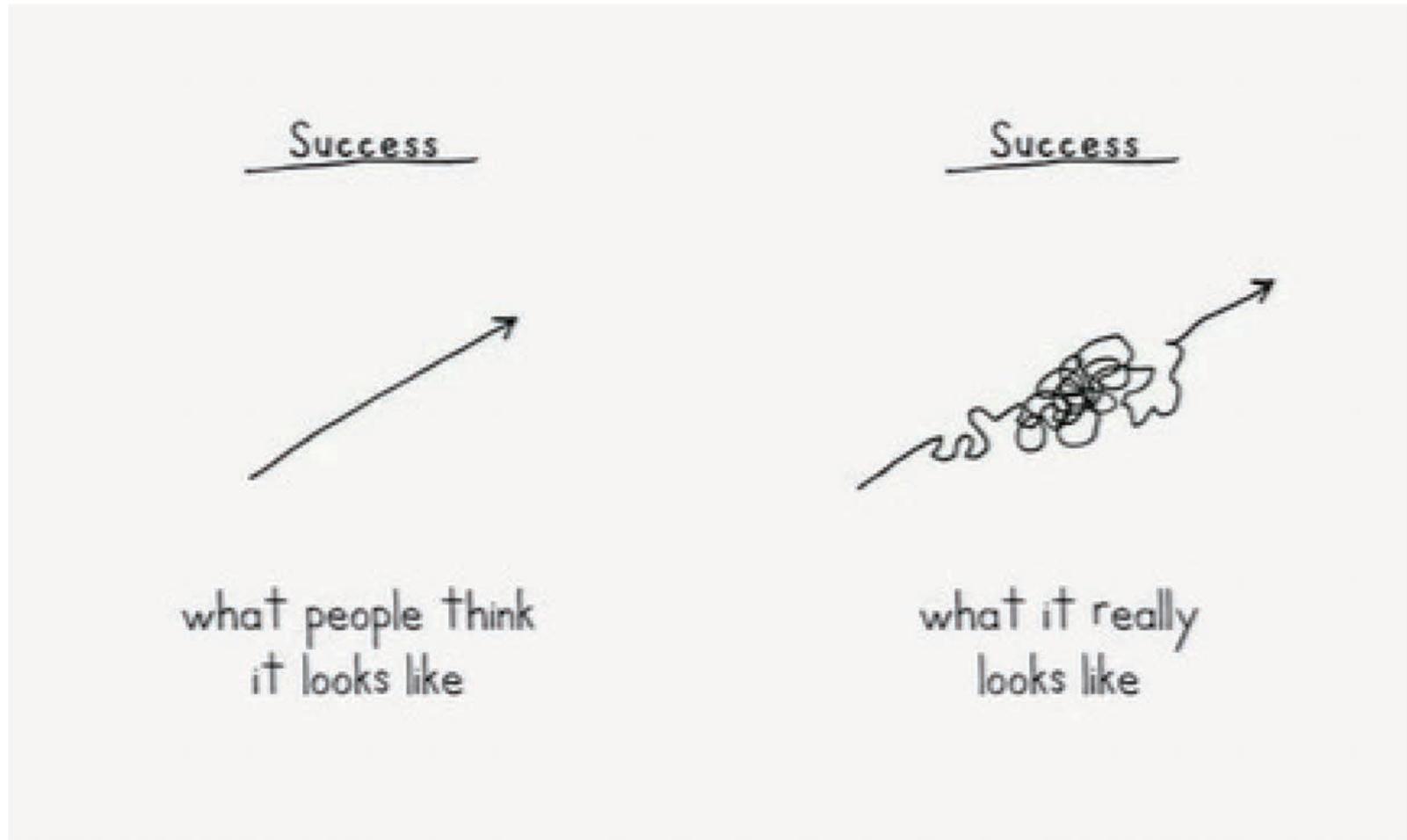


4 Benefits of Practicum Projects

1. Bottom-line Results
2. Unparalleled Educational Experience – Students Understand Sponsors' Perspectives
3. Companies Understand Student Abilities
4. Build Relationship with Company



Higher Education Ideals vs. Standard Business Risk



Practicum Example: Vehicle and Lawn Mower Manufacturer Warranty Claims

The Data: Warranty Claims Data for X years

Proposed:

- Trends/outlier across dealers/maintainers

- Which components have largest impact on cost/rate of claim

 - Underlying correlates?

- Predict time-to and cost-of next failure? Specific, general, and at fleet level

- Association Analysis of Claims

- Recommendation for Warranty Reserve

Results

Impact

Practicum Example: Vehicle Telematics

The Data: Telematics/sensor data from fleet of vehicles

Proposed

- Analyze/predict high volume/cost faults before they happen

- Analyze/predict service call likelihood

- Segment customers for tiered service plan marketing

Results

Impact

Practicum Example: Business to Business Product Pricing

The Data: Historical price book, quotes, and resulting sales (customer anonymized with some attributes retained)

Proposed

- Develop price optimization model for automated updating

- Segment customers

- Establish automated price floors, targets, and stretch prices

- Establish price floors, targets, and stretch prices that can be adjusted to business strategy

Results

Impact

Practicum Example: Vehicle Residual Pricing

The Data: Daily New and Used Vehicle Transactional Data, Vehicle Attributes, and Historical Incentives (Sponsor and Competitors)

Proposed:

- Analyze time sensitive competitive response to incentives impact to vehicle residuals

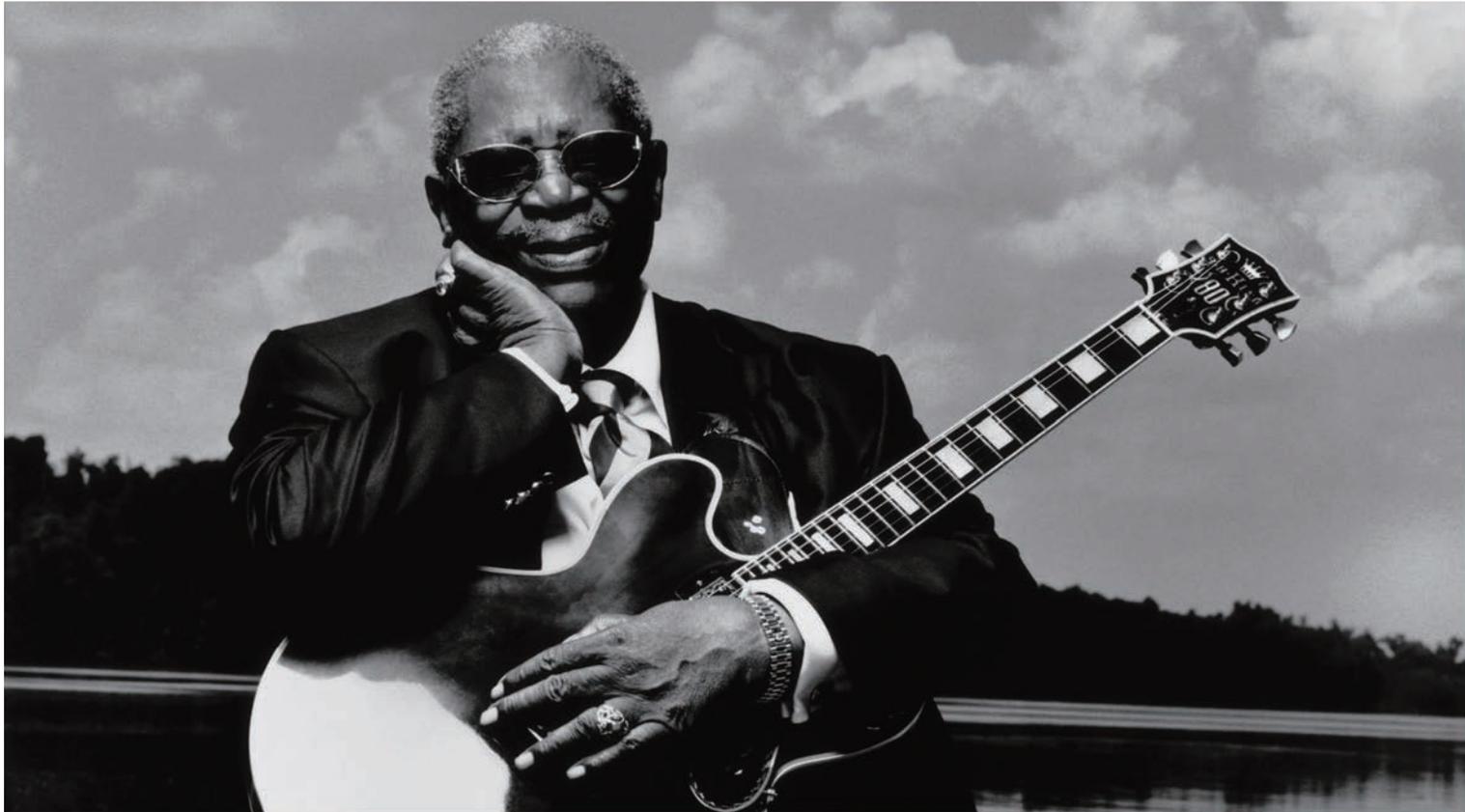
- Adjust for channels and segments

- Provide visual tools

Results

Impact

The Value of Experience



B.B. King on new blues guitarists: “Its not just that you can play that note, you gotta know why its there.”

Project Timeline

Early round proposal review: April 1

General round proposal review: July 1

Sponsors for current year selected by August 1

All arrangements including NDA and secure data transfer completed by: September 1

Project kick-off meetings held between September 15-30

Ongoing liaising of project

Midpoint review meeting by December 1

Ongoing liaising of project

Final presentation to sponsor held in end of April

The Proposal Process

Final Deadline of **July 1st** each year

1-2 page webform submitted online:

https://analytics.ncsu.edu/?page_id=2859

...or just email me directly: cjwest4@ncsu.edu

No fee

Under signed confidentiality agreement

IP is the sponsor's

We don't seek publication

Our only interest is student experience

Sponsor specifies the software (SAS, Python, R, Tableau)

Deliverables include Report, Executive Presentation, Code, Applications, Visual Tool, etc

What makes a proposal competitive for selection?

Bottomline business value/impact – the vision statement with some business context

3 to 7 specific analytic objectives/deliverables

- Confirm/disconfirm internal working intuitions/hypotheses

- Predictive modeling aligning with analytic techniques taught in the MSA: https://analytics.ncsu.edu/?page_id=123

- Visualization tools

Describe the data set you intend to transfer

- Size (50MB – 1TB), Dimensions, Timeline, Filetypes

- Clean vs Messy (a good thing to us!)

- Key joins/mergers that may be required

- No personally identifiable information (anonymized)

What we don't think we do well...

Supply chain optimization

- Data is siloed and difficult to connect

- Business context is difficult to discover and master within timeline

- Requires supply chain experience to know the right questions to ask

Factory Automation Variation

- Manufacturing context is difficult to discover and master within timeline

- Finding data context understanding within sponsor is challenging

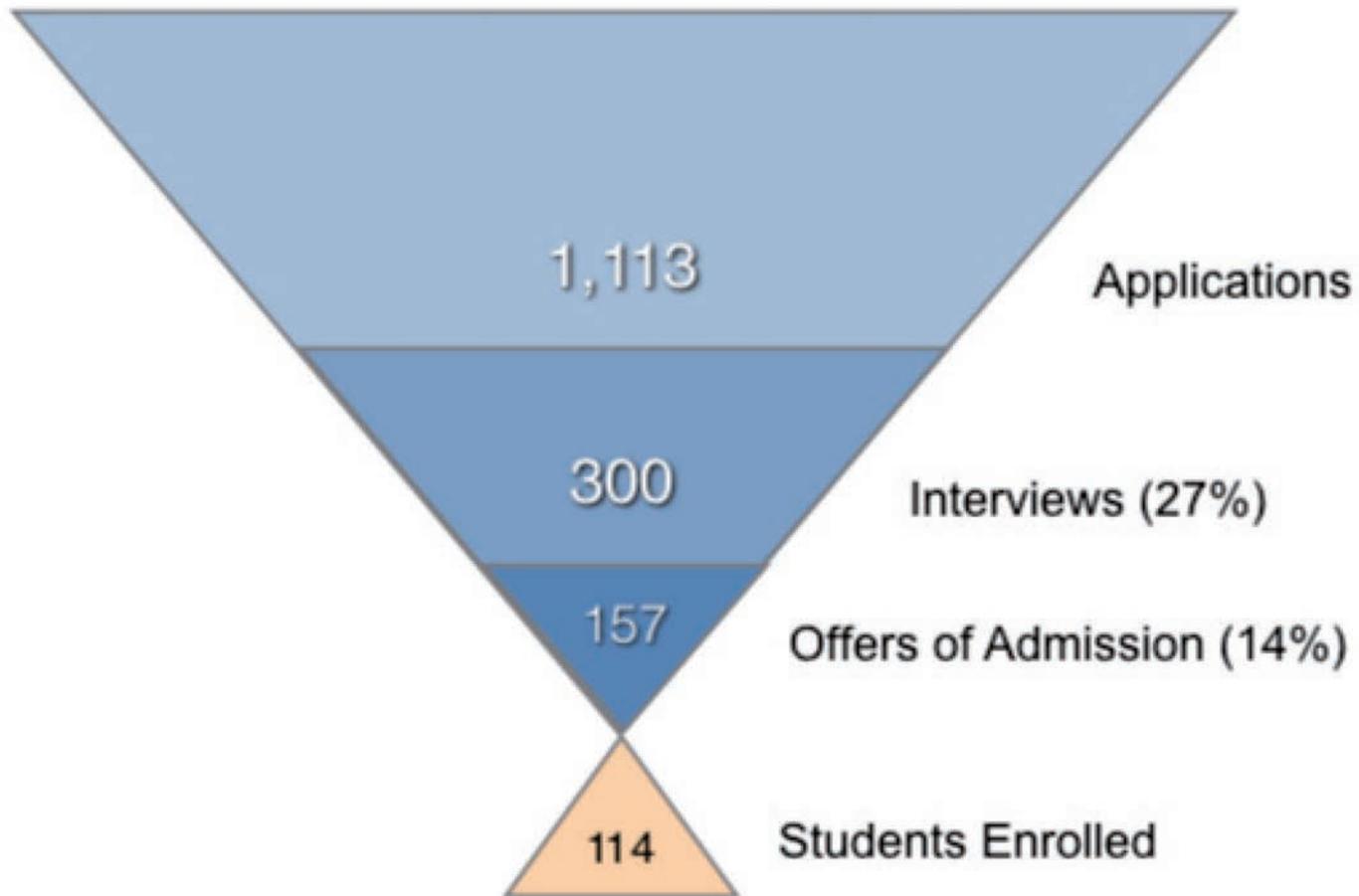
- Better suited as an Industrial/Manufacture Engineering Project

Some Science and Agriculture Project Proposals

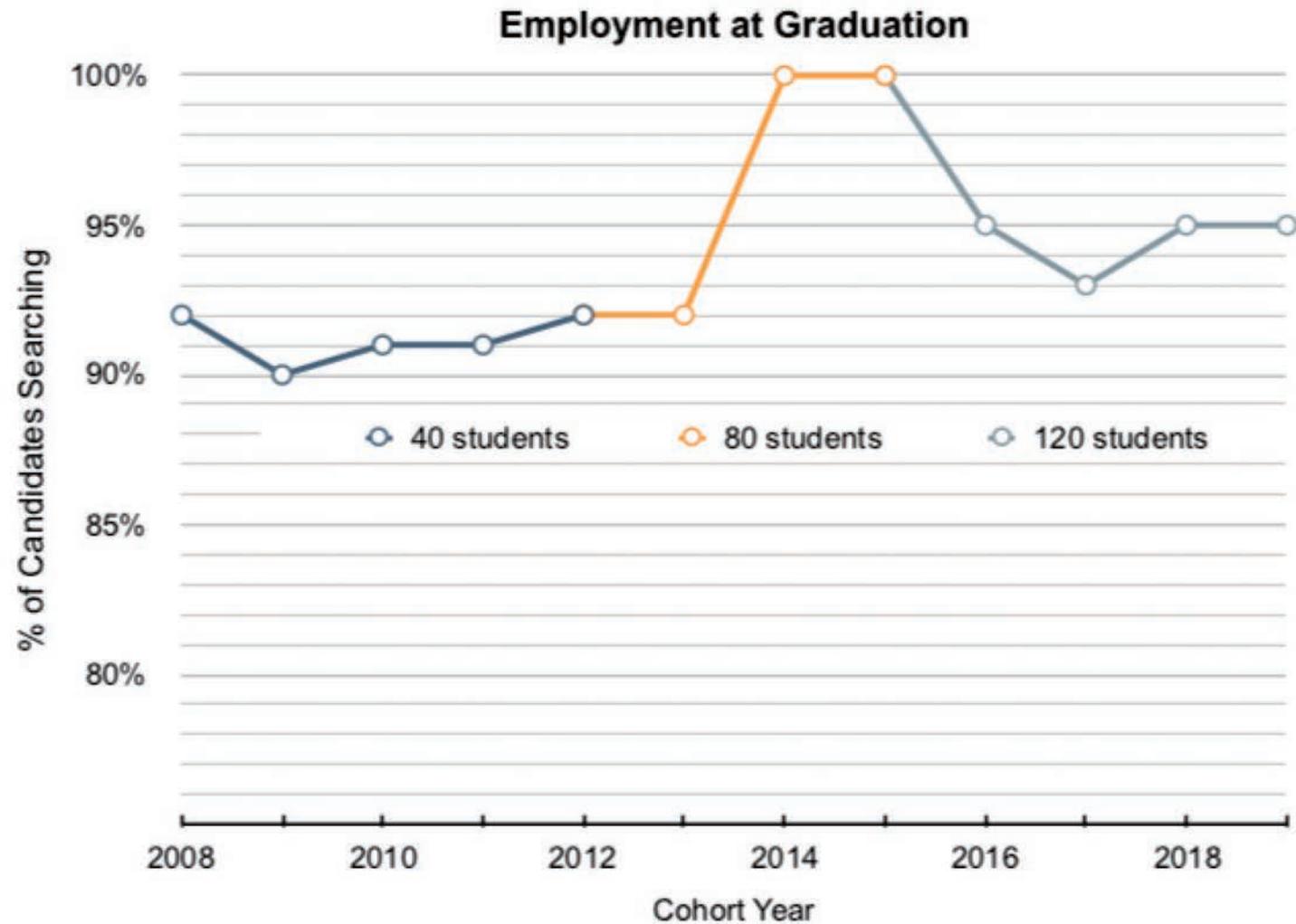
Teach to the Talent Level



ADMISSIONS FUNNEL



Results



Results

MASTER OF SCIENCE IN ANALYTICS

2019 EMPLOYMENT REPORT

Number of graduates:	111
Number of graduates seeking new employment:	110
Candidates employed at graduation:	95%
Average base salary:	\$98,500
Number of employers interviewing (number on site):	146 (54)
Median number of initial job interviews per candidate:	12
Median number of offers of employment per candidate:	2
Job placements facilitated by the Institute:	94%
Estimated ROI payback period in months:	23
Total number of reported job offers:	262
Job placements based in North Carolina:	48%
Job placements based in U.S.:	100%
Candidates reporting salary data:	100%



Placement results for Class of 2019 reported as of May 15, 2019.

At Scale!!!



IAA Information

- Website:
 - <http://analytics.ncsu.edu/>
- Contact Information:
 - chris_west@ncsu.edu

