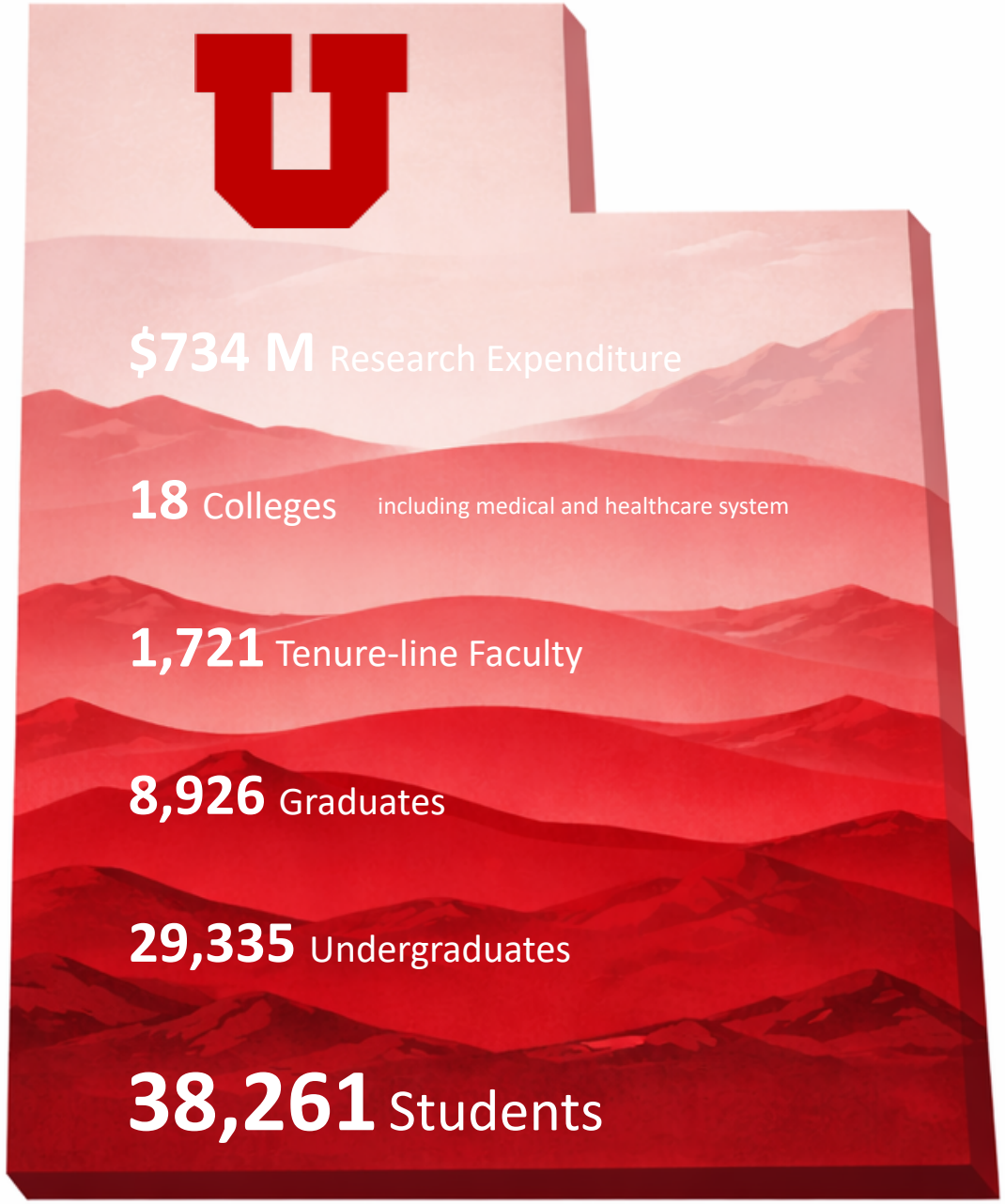
air forum | WASHINGTON, D.C.
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Who Says Yes? Using Predictive Analytics to Determine Matriculation

Presented by Jessica Schmidt and Luis Oquendo



THE UNIVERSITY OF UTAH®



About UAIR

Team of 40+ individuals organized into 4 core teams:

1. Institutional Reporting (external focus)
2. Analytics & Reporting (internal focus)
    i. Academic Reporting Team (student data focused)
    ii. Administrative Reporting Team (finance, research, employee, facilities, space)
    iii. Experience Analytics Team (internal surveys and engagement data)
3. Data Management
    i. Architecture Team
    ii. Engineering Team
4. Data Governance

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About UAIR

We serve across data domains including:

Student, faculty/staff (employee), finance, research, facilities, space, experience and event analytics

Core Services Include:

Official external reporting (IPEDS, state compliance, ranking surveys)

Internal analytics including institution-serving dashboards

Enterprise-level data models

Large-scale internal surveys (students/faculty/staff)

Data science and advanced analytics

Data governance

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The Real Issue

Yield Isn’t Random

- Not all admitted students enroll
- Resources are limited
- Need to prioritize who is most likely to commit
- Traditional reports don’t guide action

Key question: Who is most likely to say yes?

Research Question

- **Main Question:**
  - What predicts **commitment among admitted first-time freshmen**?

- **Independent Variables:**
  1. Major declaration
  2. Residency
  3. High school GPA
  4. GED completion (if applicable)
  5. Control for demographics

Data Overview

- **Source:** UAIR Student Application Table
- **Timeframe:** Fall 2014-2023
- **Population:**
  - **142,245** First-time first year

Includes:

  - Domestic + International
  - Unit: 1 application = 1 observation

Methodology

- **Approach:**
  - Descriptive statistics
  - Logistic regression

Why Logistic Regression?

1. Binary outcome (matriculate vs not)
2. Interpretable (odds ratios, marginal effects)

Disambiguation of Limitations

Missing variables:

1. Financial aid packages
2. Campus visits
3. Engagement data

Logistic Regression Model: Odds Ratios

Final Reduced Model

Hide

```
# Final reduced model
#model <- glm(matr_num ~ HS_GPA + major_num + male_num + fem_num + amin_num + asian_num + black_num + hispanic_num + multira
c_num + nhpi_num + white_num + admit_num + campus_num + ged_num + app_num + res_num,
              #data = matr,
             # family = "binomial")

#summary(model)
```

Hide

```
# Odds ratios
exp(coef(model))
```

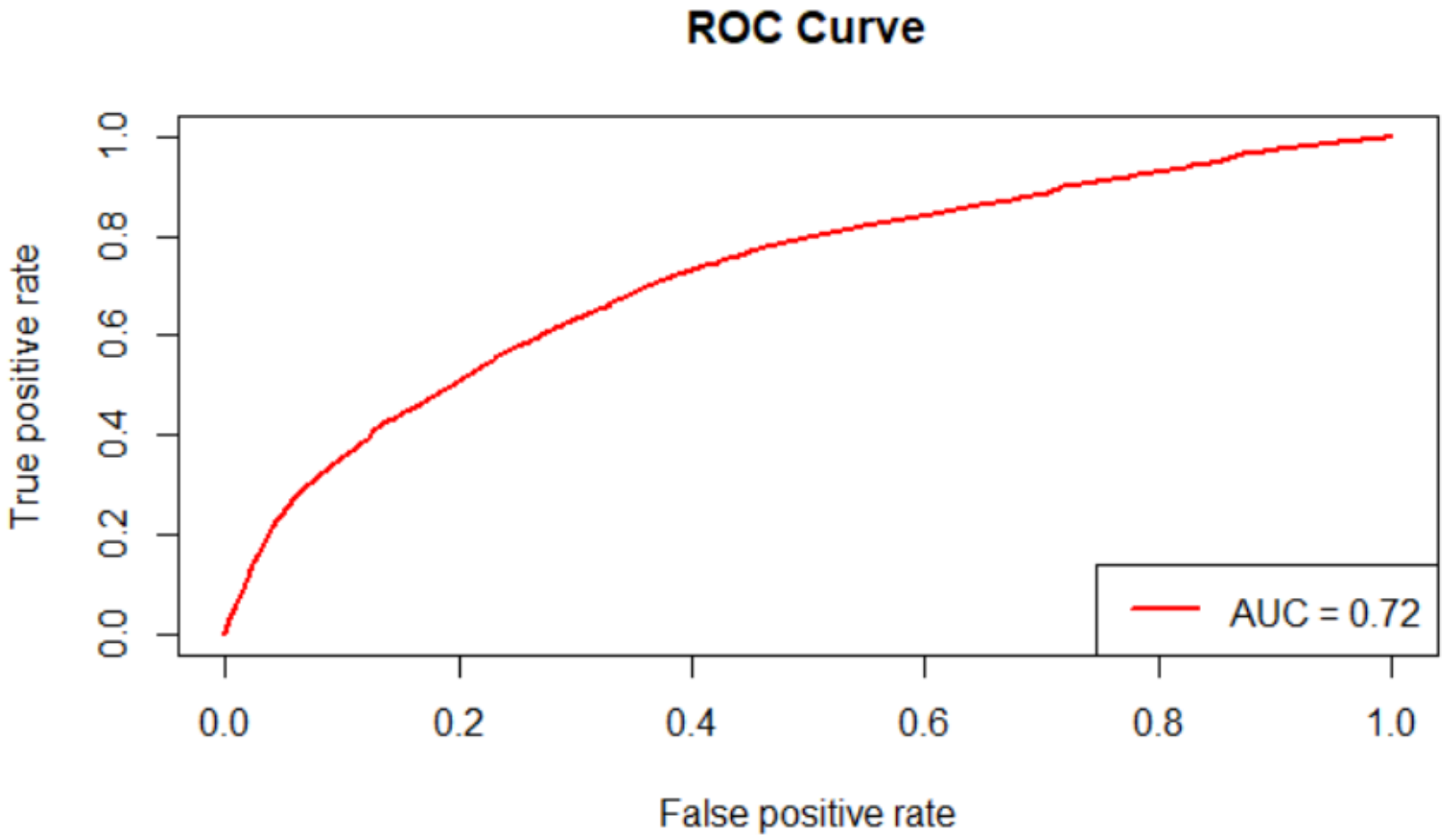
Logistic Regression Model: Marginal Effects

```
# Marginal Effects
logitmfx(matr_num ~ HS_GPA + major_num + GENDER + IPEDS_ETHNICITY + ged_num + res_num, data = matr)
```

```
Call:
logitmfx(formula = matr_num ~ HS_GPA + major_num + GENDER + IPEDS_ETHNICITY +
    ged_num + res_num, data = matr)

Marginal Effects:
```

Logistic Regression Model: Accuracy



Moving toward results

Interpreting Results

- **Translating the model:**
  - Odds Ratio > 1 → *increases likelihood*
  - Odds Ratio < 1 → *decreases likelihood*
  - Marginal Effect → *% change in probability*

👉 **Focus on marginal effects for decision-making**

Key Predictors (The Big Picture)

Table 1. Matriculation Analysis

DV: Matriculation	Estimate	Odds Ratio	Marginal Effects
High School GPA	-0.92 (0.02)***	0.40	-0.21
Major Declared	0.12 (0.01)***	1.13	0.03
Residency	1.36 (0.01)***	3.91	0.30
Observations	142,245		

Note: Standard errors in parentheses. Significance: *p < .05; ** p < .01, *** p < .001

Residency (Most Important Finding)

Utah Residency = +30% likelihood to commit

- Odds ratio: 3.91
- *Largest effect in the model*

Interpretation

- Local students are far more likely to enroll
- Geography matters more than academics

Goal: Focus yield strategy on residency status

GPA (Counterintuitive Insight)

Higher GPA → LOWER likelihood to commit (-21%)

- Odds ratio: 0.40

Interpretation

- High-achieving students have more options
- Likely admitted to more competitive institutions

Goals:

1. Increase engagement for high-GPA students
2. Compete with peer institutions

Major Declaration

Declared Major = +3% likelihood

- Small but meaningful

Interpretation

- Students with direction are more committed

Goals:

1. Encourage early major exploration/declaration
2. Improve advising + communication

Important Context

⚠ **Critical Note:**

- These are *associations*, not causes
- Results reflect structural + systemic factors

Use responsibly:

- Do NOT reduce access
- DO improve support and outreach

From Model to Strategy

Key Shift: Insight → Action

Results can be used to:

- Target communications
- Adjust recruitment focus
- *Inform leadership decisions*

Example Applications

Residency

→ Out-of-state yield campaigns

High GPA

→ Personalized outreach

Undeclared students

→ Major exploration programs

What This Can Enable

1. **Better** leadership visibility
2. **Smarter** resource allocation
3. **More** targeted recruitment

Key Takeaways for Your Institution

- **Statistical modeling *is accessible***
- Revisiting established frameworks can still matter
- This is an iterative process
- Collaborate with relevant stakeholders
  - Stay in tune with stakeholder issues

End goal = data-informed decision making

Connect With Us





Jessica Schmidt, MSDA

- **Email:** Jess.Schmidt@utah.edu
- **LinkedIn:** www.linkedin.com/in/jessica-elaine-schmidt

Luis Oquendo, Ph.D.

- **Email:** Luis.Oquendo@utah.edu

Thank you!