

# ECE 143 FA19 TERM PROJECT

## Analysis of Education & Compensation at UC Schools

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# Dataset Introduction

## CAPE

Course & Professor  
Evaluations



Courses recorded: 31,268  
Professors recorded: 3714

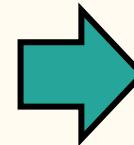


## UCOP Wages

University of California, Office  
of the President



UC San Diego : 35370+  
UC Los Angeles : 38870+  
UC Berkeley : 59668+  
(across years 2014 - 2018)



## Merged

(only for UC San Diego)

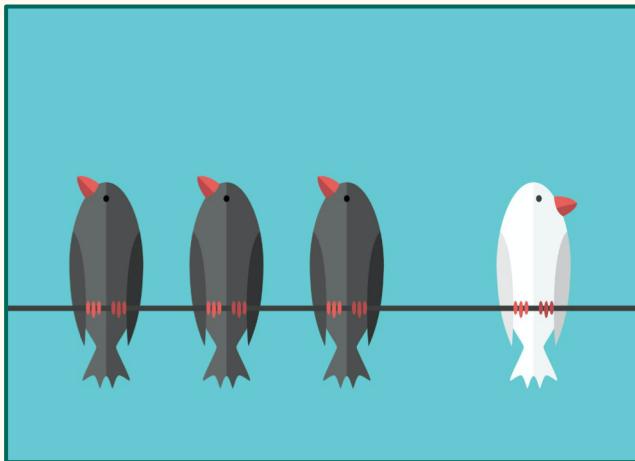


UC San Diego : 31487  
Intersection: 89%

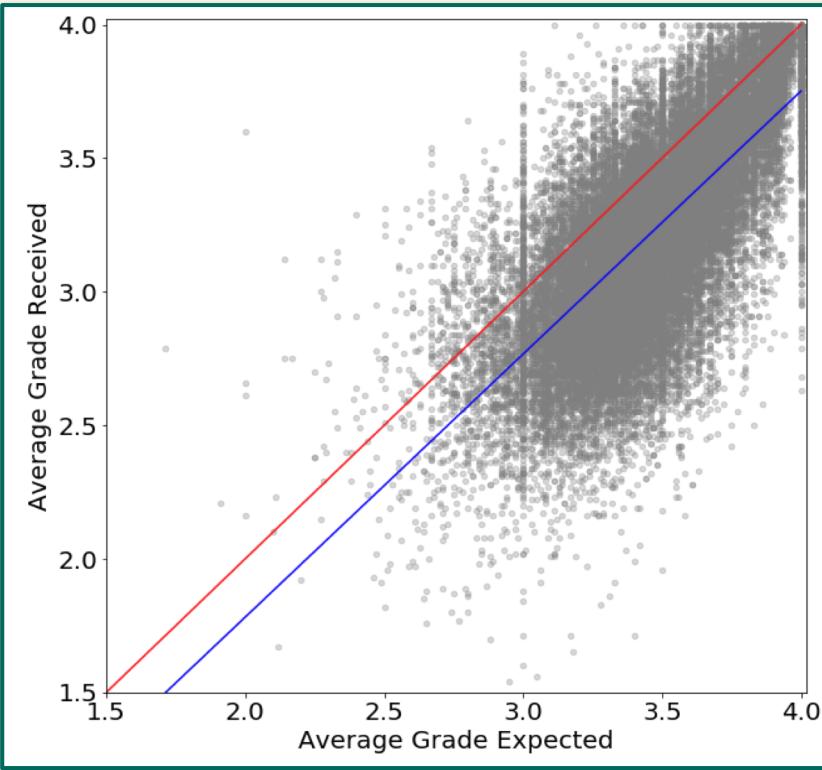
# CAPE Dataset Biases

Surveys provide an **approximation to the truth**

- **Response rate:**  $51.4\% \pm 20.4\%$
- **Noisy:** Professors incentivise responses for extra credit -> “garbage” responses.
- **Negativity Bias:** Negative things tend to affect us more than positive things
- **Self-serving Bias:** e.g. misattributing a poor grade to a teacher’s poor teaching ability



# Expectation vs Reality - Course Grades



**Red Line:**  $y = x$   
**Blue Line:**  $y = 0.98x - 0.19$   
(Linear Least Squares Regression)

- Some instructors may do a poor job at informing students their current grades.
- In general, students may tend to overestimate their abilities.

# About GPA Booster Classes...

Going into your "easy A" class final that turned out hard



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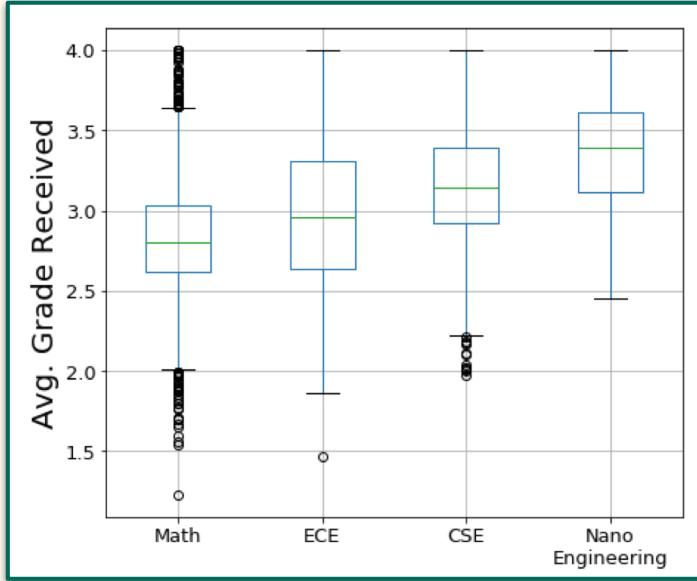
96 Comments

*Source: "UCSD Memes for Sleep Deprived Teens" Facebook Page*

# ...Which Departments Contain the Most?

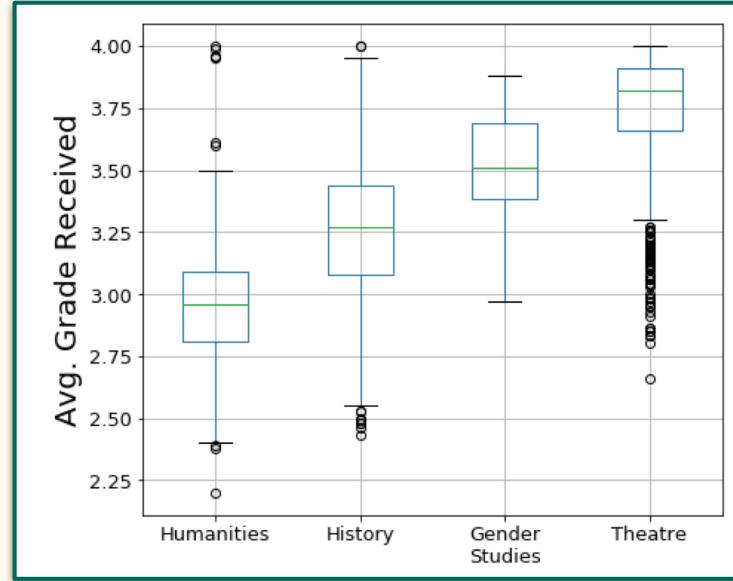
## STEM Departments

Overall  $3.06 \pm 0.37$  GPA Received



## Non-STEM Departments

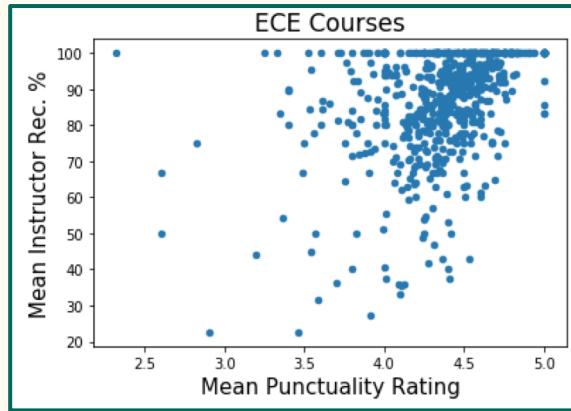
Overall  $3.40 \pm 0.33$  GPA Received



- MATH, ECE, and CSE GPA gap may be unfair.
- Perhaps latin honors should be department-specific.

| Latin Honor Conferred | Final GPA at UCSD |
|-----------------------|-------------------|
| Summa Cum Laude       | 3.936-4.000       |
| Magna Cum Laude       | 3.852-3.935       |
| Cum Laude             | 3.725-3.851       |

# Attributes Most Conducive to Positive Student Experience

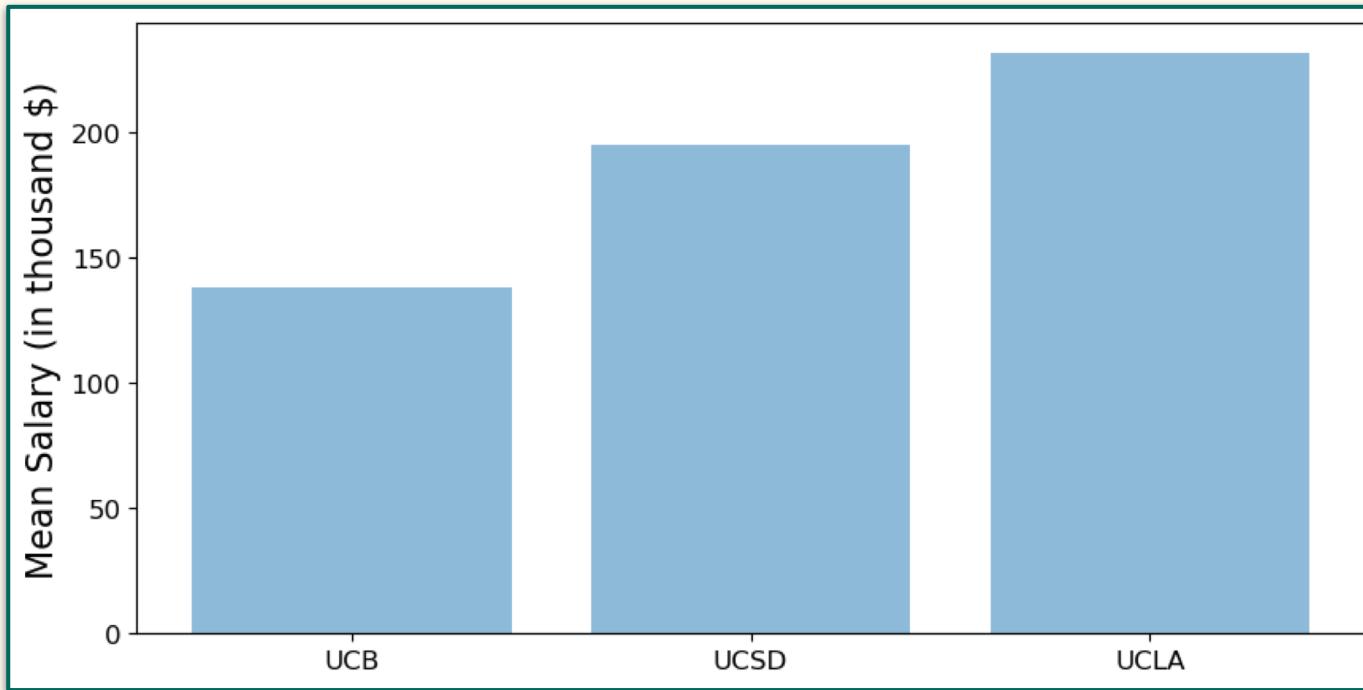


| <u>Correlation Magnitude</u> | <u>Interpretation</u> |
|------------------------------|-----------------------|
| 0.70 to 0.90                 | High correlation      |
| 0.50 to 0.70                 | Moderate correlation  |

| <u>Instructor Evaluation Criterion</u>         | <u>Correlation with Overall Rating</u> |
|--|--|
| Explanation Quality                            | 0.89                                   |
| Preparedness                                   | 0.83                                   |
| Command of the Material                        | 0.81                                   |
| Attention-Holding                              | 0.80                                   |
| Expression of Concern for Students' Learning   | 0.79                                   |
| Understanding of differences (eg race, gender) | 0.76                                   |
| Clear & Audible Speech                         | 0.70                                   |
| Academic Integrity Enforcement                 | 0.71                                   |
| Punctuality                                    | 0.66                                   |
| Accessibility Outside Class                    | 0.57                                   |
| Exam Representativeness                        | 0.52                                   |

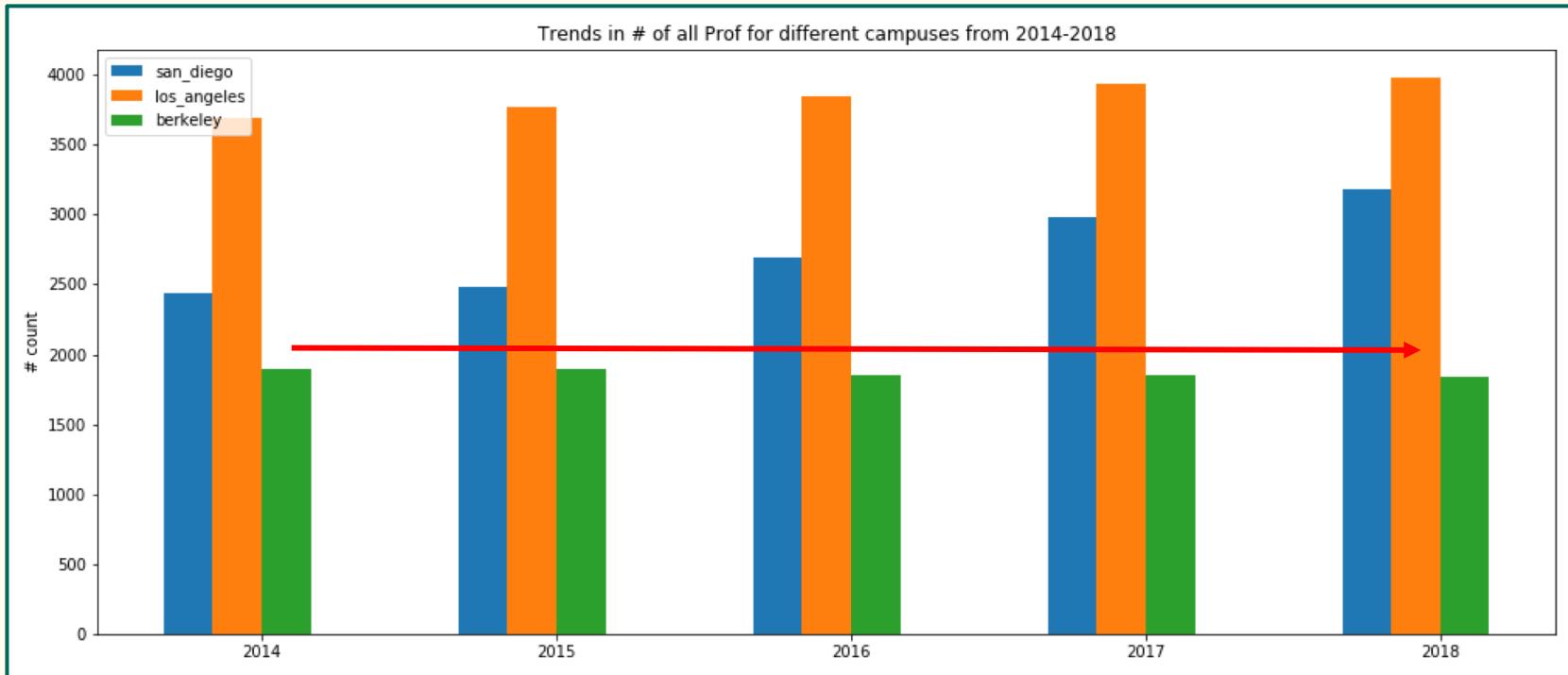
- Instructors could focus on highly correlated traits.

# Which School Has the Highest Paid Professors?



- Professors working at UCLA earn the most money.

# Growth In Number of Professors Over Time



- UCSD and UCLA are growing rapidly while UCB is in equilibrium.

# UCSD Employment Title vs Teaching Quality

| Title                 | Median Salary | # Employed | Ratings   |
|-----------------------|---------------|------------|-----------|
| Lecturer              | \$44,000      | 482        | 91% ± 11% |
| Senior Lecturer *     | \$120,000     | 15         | 93% ± 9%  |
| Assistant Professor   | \$91,000      | 229        | 88% ± 13% |
| Associate Professor * | \$102,000     | 234        | 89% ± 11% |
| Full Professor *      | \$156,000     | 592        | 85% ± 15% |

\* Tenure or Security of Employment

- Are full professors, despite their high pay & prestige, actually *worse* at teaching than “normal” lecturers?

# Employment Title & Teaching Quality Relationship

| Title          | Median Salary | # Employed | Ratings   |
|----------------|---------------|------------|-----------|
| Lecturer       | \$44,000      | 482        | 91% ± 11% |
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- Is this difference in mean salary statistically significant or just “noise”?
- A t-test yields  $p = 2.8 \times 10^{-13}$
- The difference in means is statistically significant.
- Cohen's d is -0.44, indicating a medium difference.

## ➤ Causes?

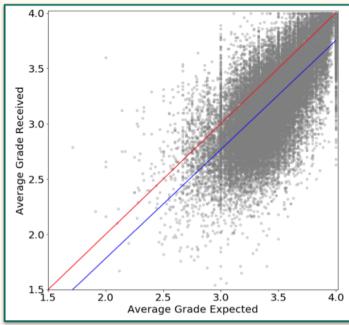
- Insufficient educational training?
- Pressure to publish or perish; no time for teaching?
- Disinterest in teaching?



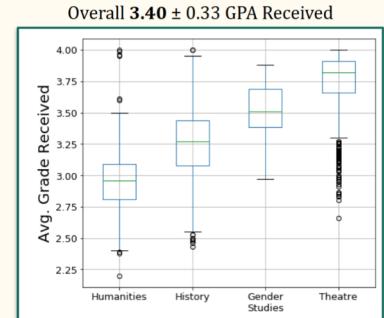
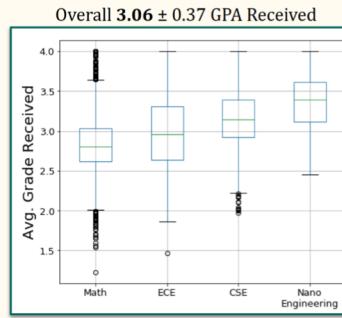
# Conclusion

*Statistically, there may be a tendency towards:*

## Overestimating GPAs



## STEM vs Non-STEM Imbalance



## Important Teaching Attributes

| Instructor Evaluation Criterion                | Correlation with Overall Rating |
|--|---------------------------------|
| Explanation Quality                            | 0.89                            |
| Preparedness                                   | 0.83                            |
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## Lecturers Outperforming Professors

| Title          | Ratings         |
|----------------|-----------------|
| Lecturer       | $91\% \pm 11\%$ |
| Full Professor | $85\% \pm 15\%$ |



Thank you!