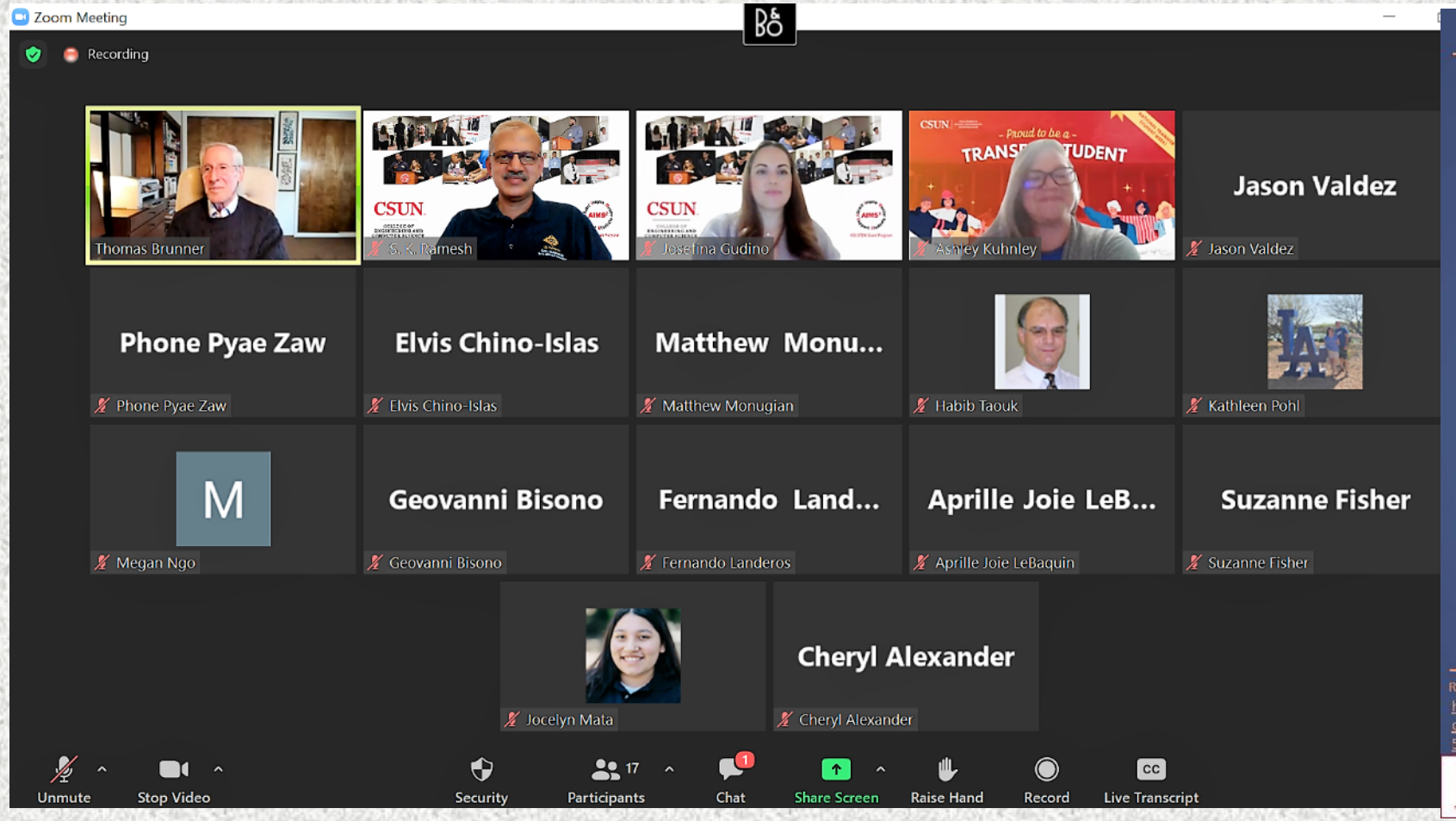
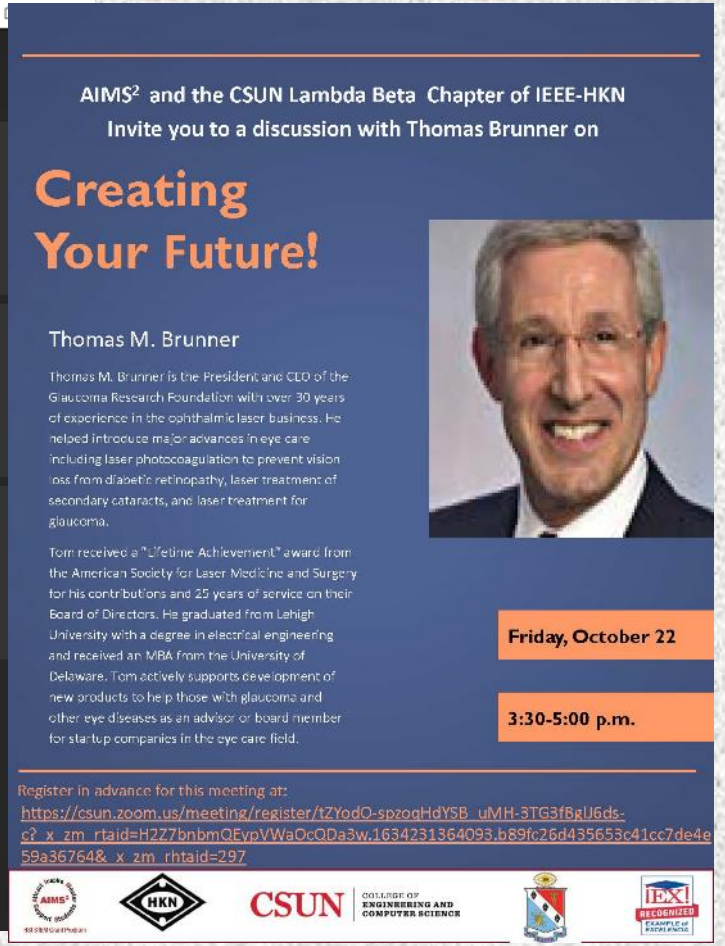
Welcome to AIMS²(HSI-STEM Grant) Meeting # 100

HSI STEM Grant Program

CSUN COLLEGE OF ENGINEERING AND COMPUTER SCIENCE





November 18, 2021, 1 PM – 2:30 PM

Photos-Courtesy: Ramesh

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AGENDA

- Welcome and Information Items – Ramesh
  - USDE reviews
  - NCE year sub-awards for CoC, Pierce, and Moorpark – Cristian Contreras
  - Report on guest talks by Tom Brunner and Cheryl Wang (Alexander)
  - Meetings Calendar – Fall 2021
- Project Assessment and Evaluation update – Nathan Durdella
  - QED Study Results – Preeta Saxena

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AIMS² and the CSUN Lambda Beta Chapter of IEEE-HKN
Invite you to a discussion with Thomas Brunner on

Creating Your Future!

Thomas M. Brunner

Thomas M. Brunner is the President and CEO of the Glaucoma Research Foundation with over 30 years of experience in the ophthalmic laser business. He helped introduce major advances in eye care including laser photocoagulation to prevent vision loss from diabetic retinopathy, laser treatment of secondary cataracts, and laser treatment for glaucoma.

Tom received a "Lifetime Achievement" award from the American Society for Laser Medicine and Surgery for his contributions and 25 years of service on their Board of Directors. He graduated from Lehigh University with a degree in electrical engineering and received an MBA from the University of Delaware. Tom actively supports development of new products to help those with glaucoma and other eye diseases as an advisor or board member for startup companies in the eye care field.

Friday, October 22

3:30-5:00 p.m.

Register in advance for this meeting at:
https://csun.zoom.us/meeting/register/tZYodO-spzoqHdYSB_uMH-3TG3fBglJ6ds-c?_x_zm_rtaid=H2Z7bnbmQEypVWaOcQDa3w.1634231364093.b89fc26d435653c41cc7de4e59a36764&_x_zm_rhtaid=297

AIMS² and the CSUN Lambda Beta Chapter of IEEE-HKN
Invite you to a discussion with Dr. Cheryl Wang on

How not to sweat the small stuff when the problem is challenging

Dr. Cheryl Wang

Dr. Cheryl Wang is an experienced healthcare provider and engineering research specialist. Dr. Wang owns her own agency where she does consulting work with nonprofit groups and some businesses. Her agency, Technology and Healthcare Solutions is well-known internationally as a leading research center for deep technology and medical science. Dr. Wang is the lead researcher and primary consultant at the organization which also received grants from the NIH, DOD, NSF, and some small private companies and universities.

Dr. Wang did an undergraduate degree in English and Creative Writing, a dual Master's of Science in Healthcare Administration and Data Science, a degree in Emergency Practice, and has a doctorate in Engineering with a focus on Engineering Management. She spent 30 years working with patients prior to achieving her own company. Dr. Wang enjoys mentoring students and talking about her time in various hospitals across the country.

Dr. Wang's research areas include data science, medical issues such as COVID-19, telemedicine, biometrics, deep learning technologies, and Big Data, AI, and computer engineering issues. She is a Senior Member of IEEE.

Saturday, Nov. 13th

2:00-3:30 p.m.

Register in advance for this meeting at:
https://csun.zoom.us/meeting/register/tZMtd-yvpz4iH9WVq2ooYdKv58cwz6nfLhvc

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Meetings Calendar for Fall 2021

- ✓ ***August 12, 2021***
- ✓ ***September 9, 2021***
- ✓ ***October 14, 2021***
- ✓ ***November 18, 2021***
- ***December 16, 2021***

All meetings on Zoom online for now

Monthly meetings above are scheduled from 1 PM – 3 PM

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QUASI EXPERIMENTAL DESIGN STUDY

November 18, 2021

Preeta Saxena, Ph.D.

Outline

- Data Sources
- Research Questions
- Outcome Measures
- Hypotheses
- Matching Method
- Data Analysis Method
- Results
- Summary Findings & Discussion

Data Sources

1. AIMS^2 Program Data*

2. CSUN's Institutional Research

*AIMS^2 participants in the QED study are limited to CSUN students.

Research Questions

1. How do the outcome measures of higher education success vary for AIMS^2 participants in comparison to a matched control group?

   - How do the outcomes vary with regard to gender?

2. Among AIMS^2 participants, which components of the programs are more effective?

Outcomes and Project Performance Measures

Gateway Course completion (Measure 1a/1b)

Grade notation of A, B, C, or credit in low-success courses*

On-track to Completion (Measure 6b/6.2)

Completed a minimum of 24 units per year

Number of units earned in 1st and 2nd year

Good academic standing (Measure 1b/1.2)

Not on Probation

Cumulative GPA 1st and 2nd year

Persistence in STEM (Measure 3b/3.2 & 6a/6.1)

Retention in CECS from fall to spring, Overall Retention in CECS

Degree completion (Measure 6c/6.3)

Degree completion in CECS, within 3 years

Program Type

Research Experience

*courses were pre-selected as part of grant objectives

Hypotheses

Hypothesis$_1$:AIMS^2 participants will have higher rates of gateway **course completion** in comparison to matched, control group.

Hypothesis$_2$: AIMS^2 participants will have higher rates for **On-track to degree** completion in comparison to matched, control group.

Hypothesis$_3$ AIMS^2 participants will earn higher **number of units** in comparison to matched, control group.

Hypothesis$_4$ AIMS^2 participants will have higher rates for **good academic standing** in comparison to matched, control group.

Hypothesis$_5$ AIMS^2 participants will have higher grade point averages (**GPA**) in comparison to matched, control group.

Hypothesis$_6$ AIMS^2 participants will have higher rates of **persistence** rates in STEM in comparison to matched, control group.

Hypothesis$_7$ AIMS^2 participants will have higher rates of **students completing degrees** in comparison to matched, control group

Hypothesis$_{1\text{-}7a}$ *Female* AIMS^2 participants will have higher success with regard to the measured outcomes in comparison to matched, female control group.

Hypothesis$_8$ Outcome success will vary among AIMS^2 participants with regard to their participation level in the various **programs** (e.g. research, peer-mentoring etc.)

Matching Method

Comparison Group

- *First-Time Freshmen/Transfers*
- *Entry Cohort Year*
- *Majoring in CECS*

Baseline Differences

- *First-Generation*
- *Full-time Enrollment*
- *Low-income (PELL)*
- *Admissions GPA*
- *Transfer Units*

Propensity Score Matching

- Calculates the conditional probability of a case being assigned to the treatment group using logistic regression.
- Predicting/independent factors were selected based on their influence on the exposure (self-selection in being an AIMS^{2}participant) as well as their influence on the outcome.

Group Size Comparisons

	Baseline (N=2,127)		Propensity Score Matching (N=131)	
	AIMS²	Comparison	AIMS² Treatment	Matched Control
First-time Freshmen	69	2,058	69	62
	(N=1,079)		(N=155)	
First-time Transfers	82	997	82	73

AIMS² participants and comparison students in the study are limited to CSUN students with entry years of 2016,2017,2018,2019

Equivalencies

Freshmen

	Baseline (N=2,127)			Propensity Score Matching (N=131)		
	AIMS[2] % of Total/ mean(sd) **(N= 69)**	**Comparison[1]** % of Total/ mean(sd) **(N=2,058)**	**Sig.** *(p)*	**AIMS[2]** % of Total/ mean(sd) **(N=69)**	**Comparison** % of Total/ mean(sd) **(N=62)**	**Sig.** *(p)*
Race/Ethnicity						
African American/Black	3%	4%		3%	2%	
Asian	9%	7%		9%	3%	
Latinx/Hispanic	82%	82%		81%	87%	
White	7%	5%		7%	3%	
Unknown	0%	2%		0%	0%	
Multi-Race	0%	0.8%		0%	0%	
International	0%	0.1%		0%	0%	
Gender			.001			.01
Female	33%	14%		33%	17%	
Male	67%	87%		67%	83%	
Age[2]	18.3 (.4)	18.4 (.5)		18.3 (.4)	18.5 (.9)	
First-Generation	77%	59%	.01	77%	73%	
Low-income (PELL)	83%	65%	.01	83%	71%	
Admissions GPA	3.5 (.4)	3.3 (.4)	.01	3.5 (.4)	3.4 (.5)	
Full-time 1st semester	100%	98%				
Transfer Units	11.9 (16.1)	6.6(18.8)	.01	11.9 (10.5)	9.5(14.3)	
Cohort 1, 2016 Fall	12%	19%		12%	16%	
Cohort 2, 2017 Fall	22%	27%		22%	18%	
Cohort 3, 2018 Fall	44%	26%		44%	29%	
Cohort 4, 2019 Fall	23%	28%		23%	37%	

Equivalencies

Transfer Students

	Baseline (N=1,079)			Propensity Score Matching (N=155)		
	AIMS[2] % of Total/ mean(sd) (N=82)	**Comparison[1]** % of Total/ mean(sd) (N=997)	**Sig.** *(p)*	**AIMS[2]** (N=82)	**Comparison** (N=73)	**Sig.** *(p)*
Race/Ethnicity			.01			.01
African American/Black	4%	2%		4%	1%	
Asian	10%	13%		10%	7%	
Latinx/Hispanic	74%	53%		74%	53%	
White	9%	25%		9%	33%	
Multi-Race	2%	2%		2%	0%	
Unknown	1%	5%		1%	6%	
International	0	0.1%		0%	0%	
Gender			.01			
Female	28%	12%		28%	25%	
Male	72%	88%		72%	75%	
Age[2]	25.0 (4.6)	25.5 (5.3)		25.0 (4.6)	25.6 (4.8)	
First-Generation	62%	47%	.01	62%	53%	
Low-income (PELL)	77%	75%		77%	78%	
Admissions GPA	3.02 (.36)	2.98 (.39)		3.0 (.35)	3.0 (.41)	
Full-time enrolled 1st semester	87%	68%	.01	87%	78%	
Transfer Units	74.1 (16.1)	74.0 (18.8)		74.0 (19)	75.0 (16)	
Cohort 1, 2016 Fall	17%	20%		17%	18%	
Cohort 2, 2017 Fall	24%	29%		24%	29%	
Cohort 3, 2018 Fall	27%	26%		27%	25%	
Cohort 4, 2019 Fall	32%	25%		38%	29%	

Data Analysis

- **Categorical Outcomes**
  - Percentages (%)
  - Hypothesis test*:* Chi-square ($p<.05$)
  - Effect Size: Odds Ratios

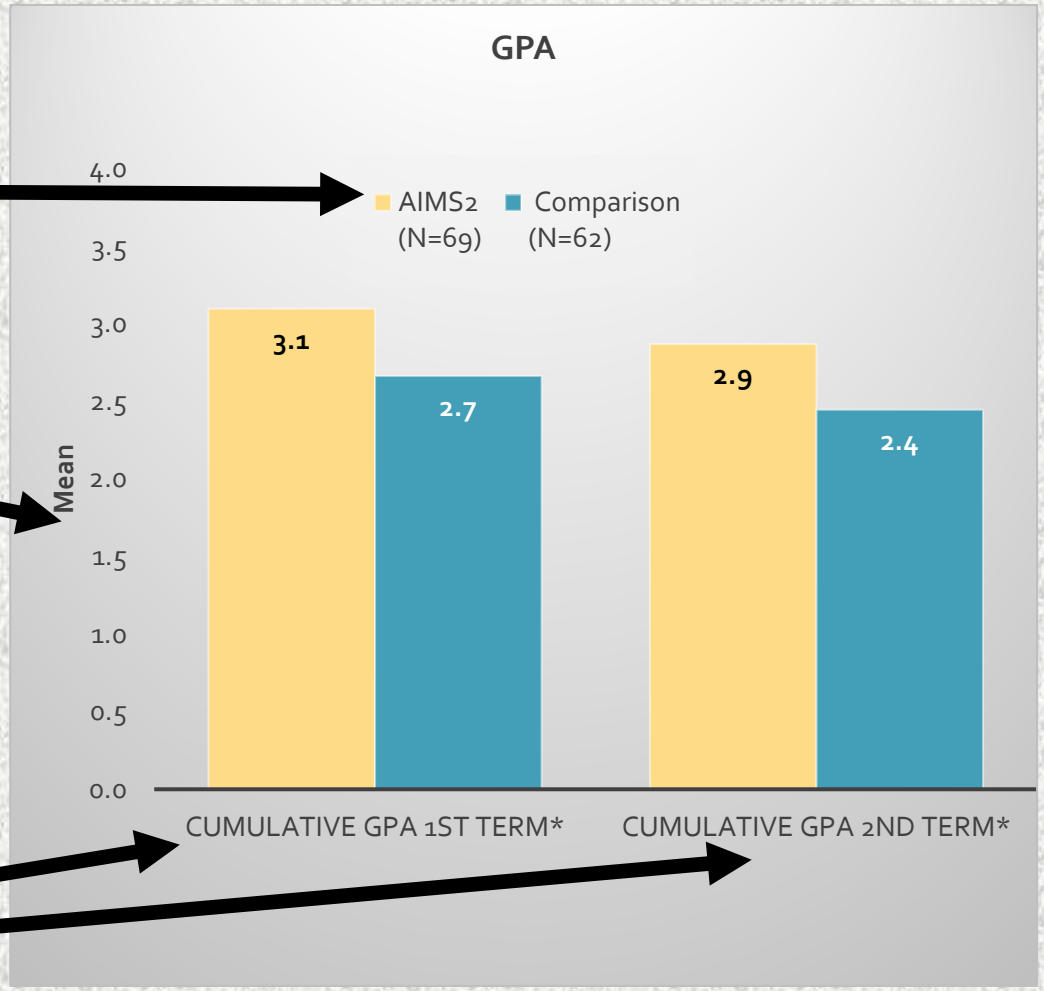
- **Numerical Outcomes**
  - Means/Standard Deviations M(SD)
  - Hypothesis test*:* *t*-tests ($p<.05$)
  - Effect Size: Cohen's D

Figures Orientation

Group and group size

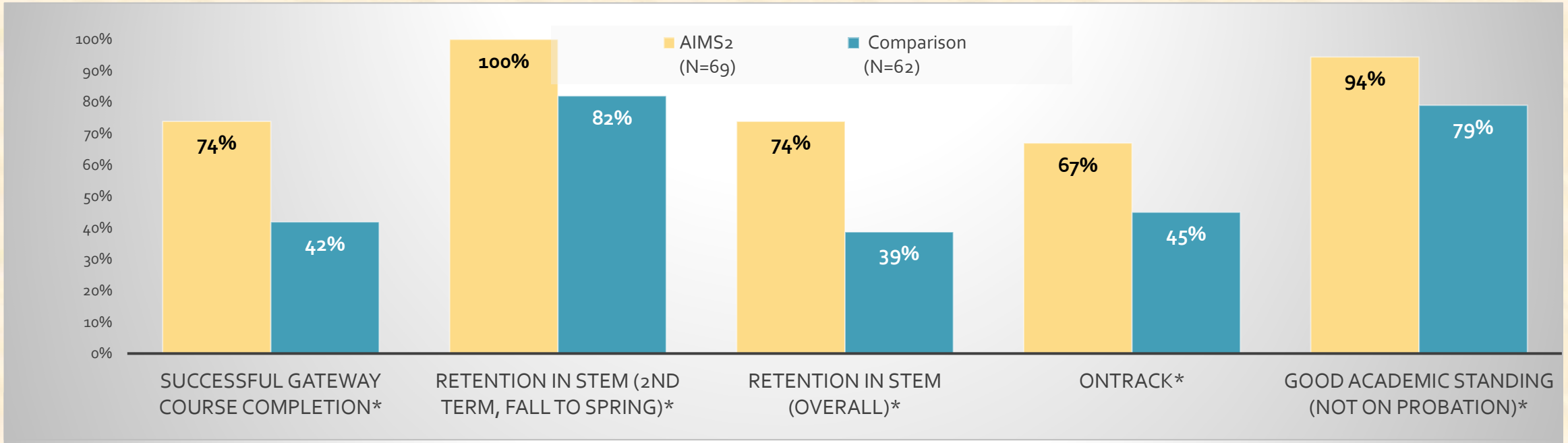
Mean score *or* Percentage

Outcome Measures

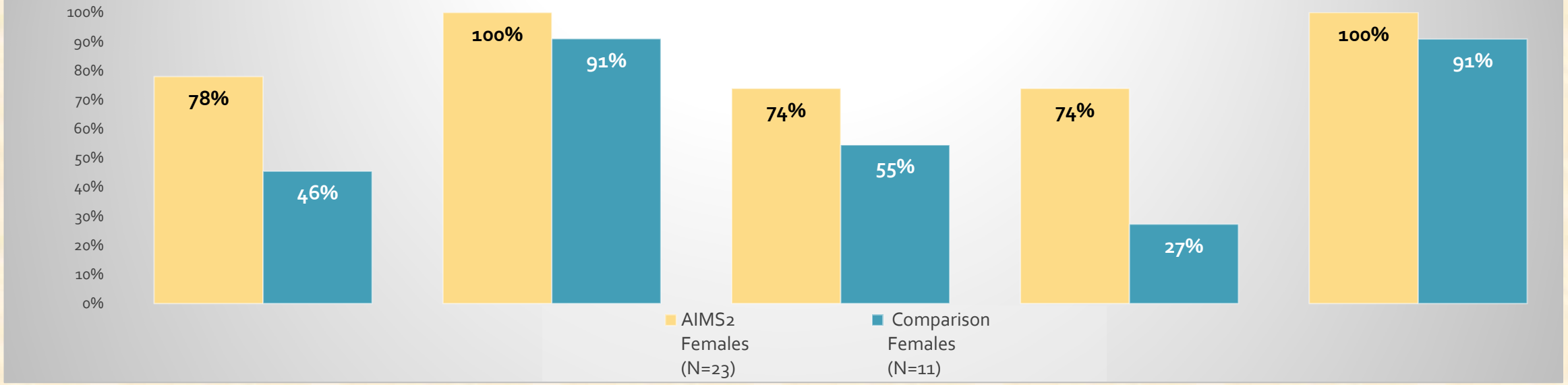


Outcomes for Freshmen

All



females

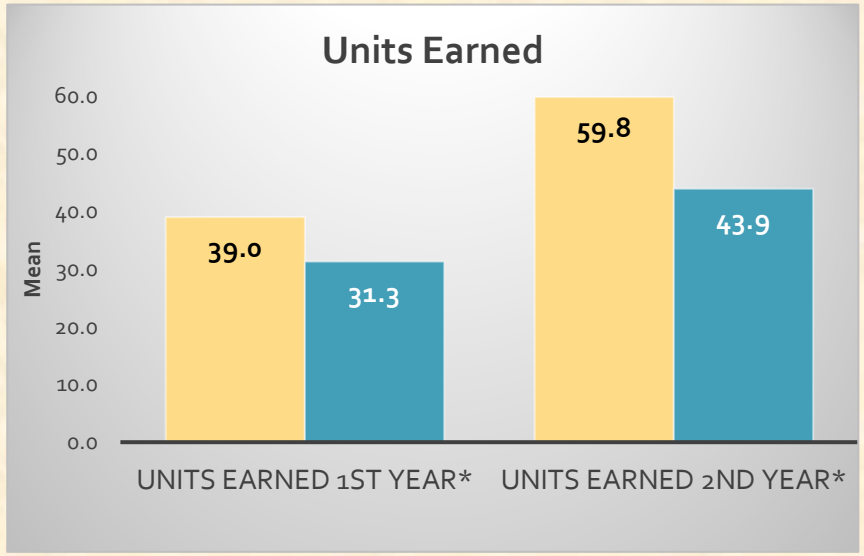


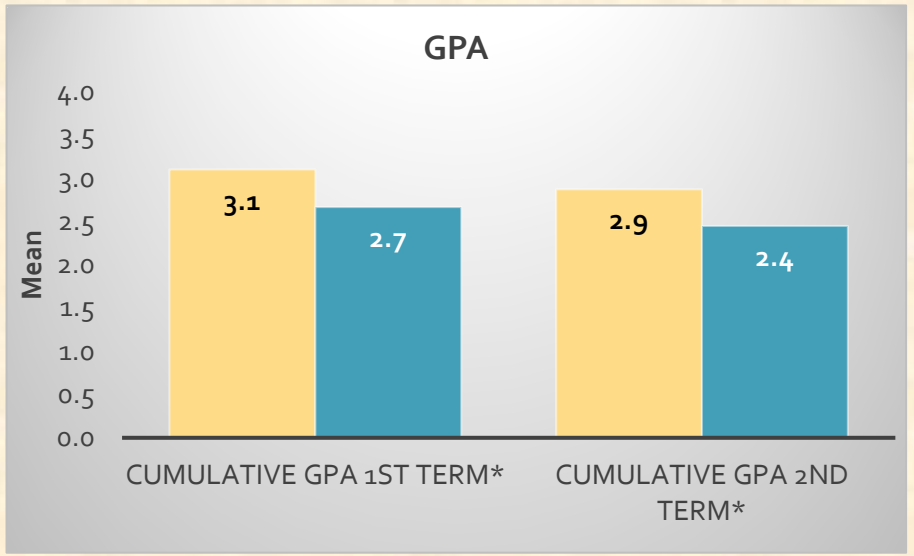
(*) in labels top chart denotes statistical significance ($p<.05$) for overall AIMS vs. Matched control.

Outcomes for Freshmen

All

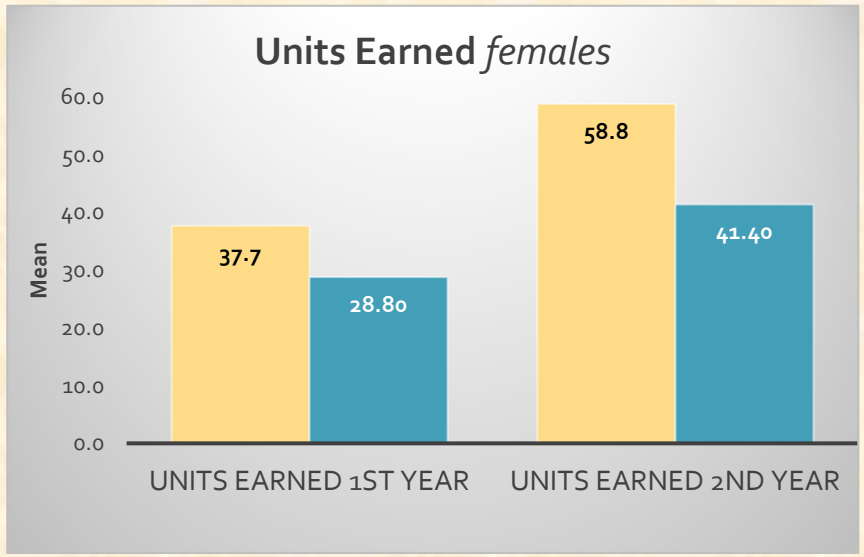
AIMS2 (N=69) | Comparison (N=62)

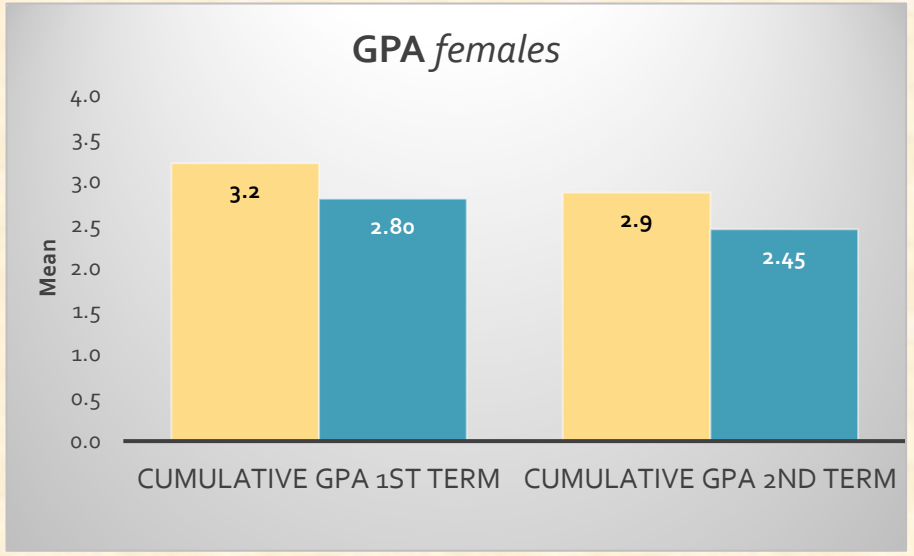




females

AIMS2 Females (N=23) | Comparison Females (N=11)

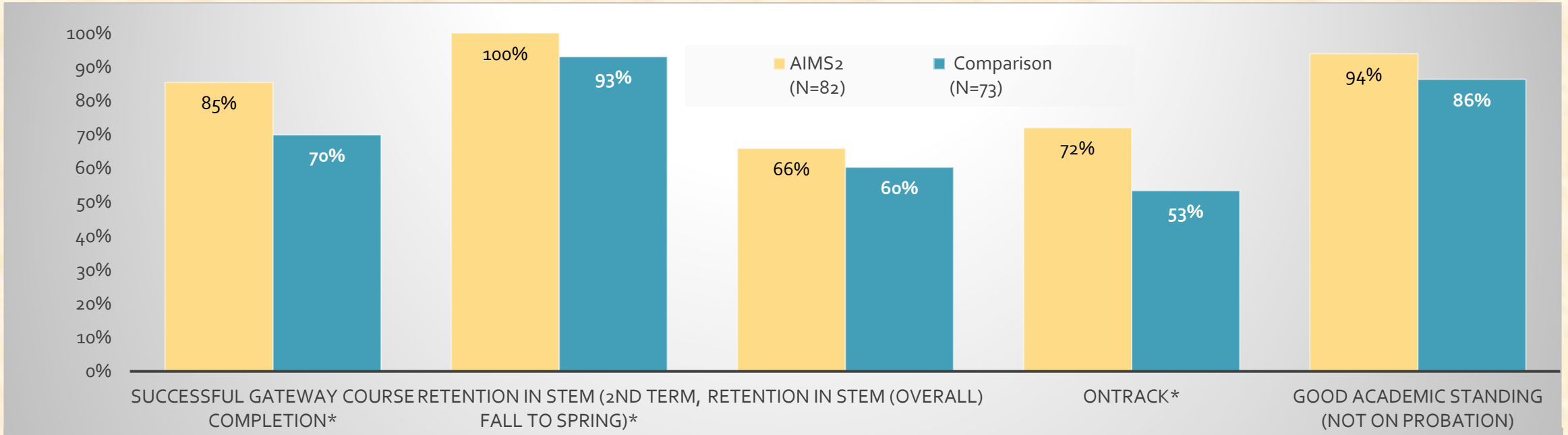




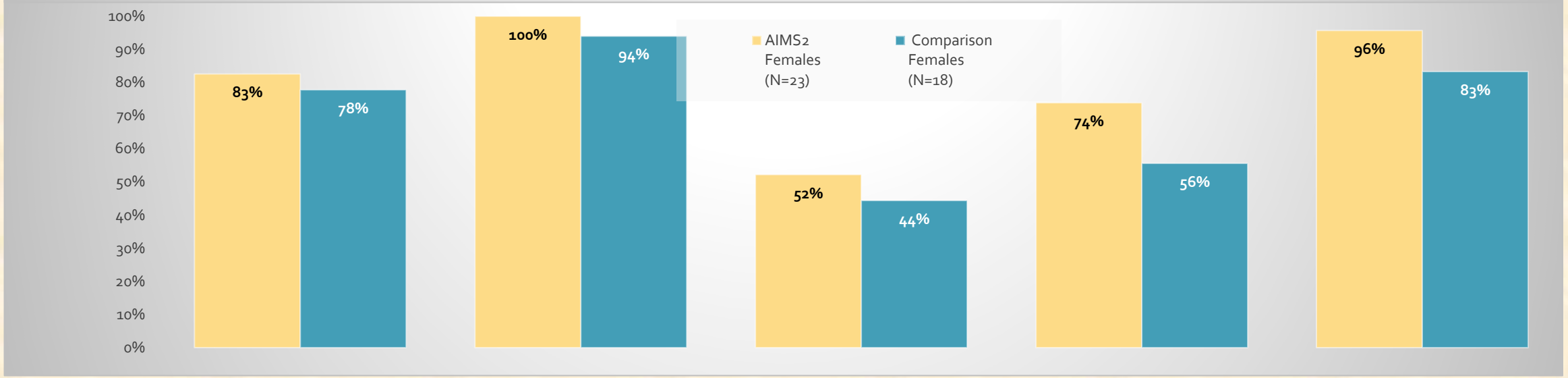
(*) statistical significance ($p<.05$) for overall AIMS vs. Matched control

Outcomes for Transfer Students

All



females

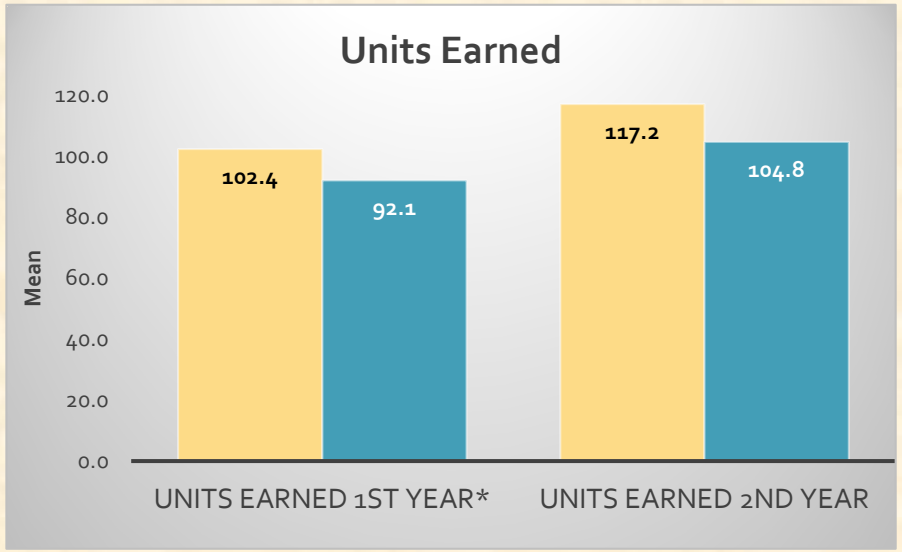


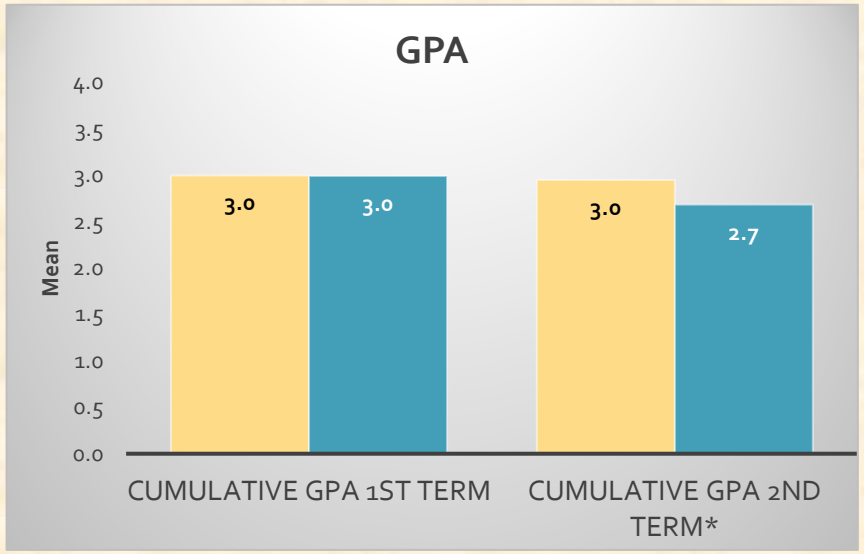
(*) in labels top chart denotes statistical significance ($p<.05$) for overall AIMS vs. Matched control.

Outcomes for Transfer Students

All

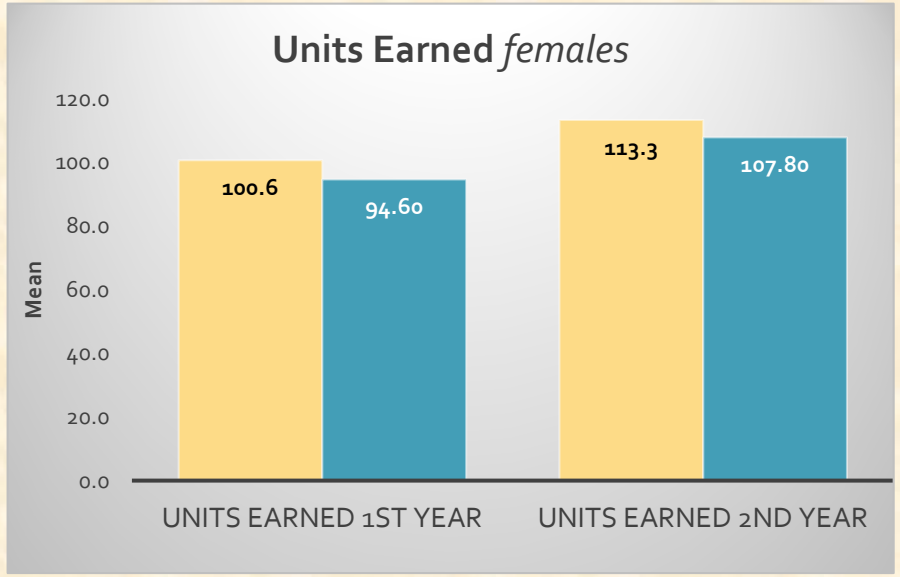
AIMS2 (N=82) | Comparison (N=73)

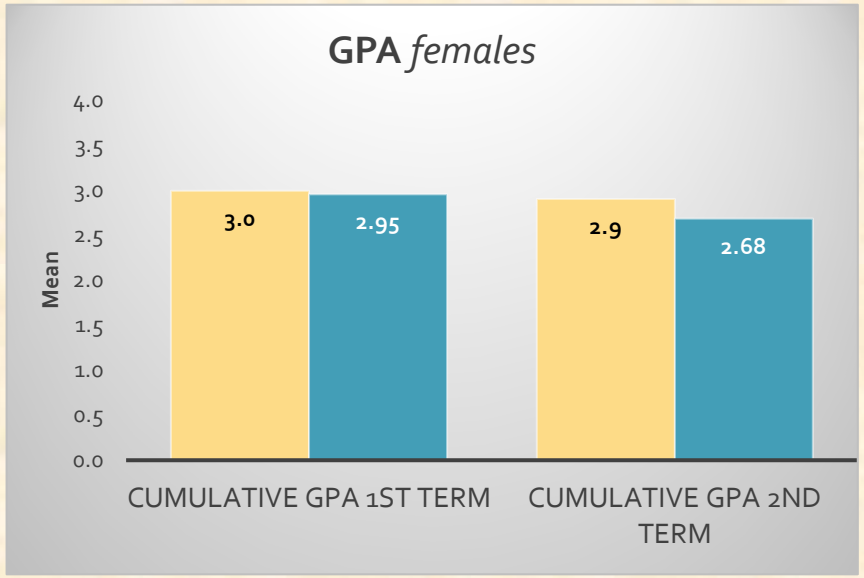




females

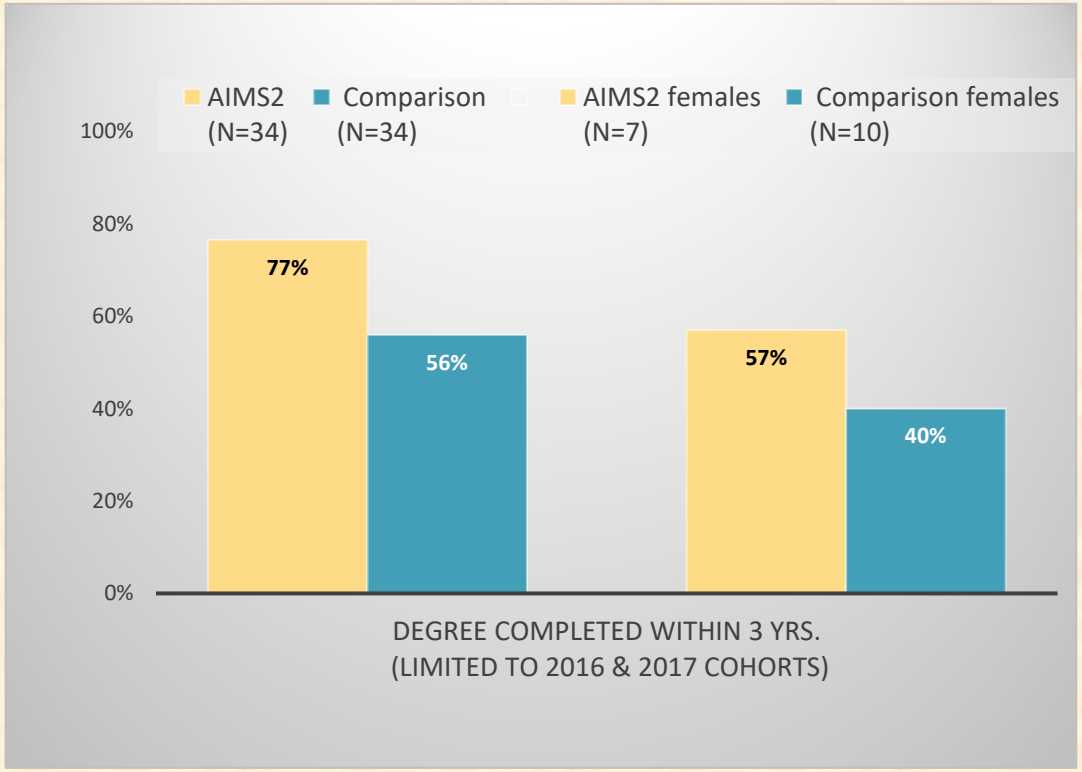
AIMS2 Females (N=23) | Comparison Females (N=18)





(*) statistical significance ($p<.05$) for overall AIMS vs. Matched control

Degree Completion for Transfer Students



77% of AIMS^2 students in the 2016 & 17 cohorts completed a degree within 3 years (vs. 56%)

57% of AIMS^2 females in the 2016 & 17 cohorts completed a degree within 3 years (vs. 40%)

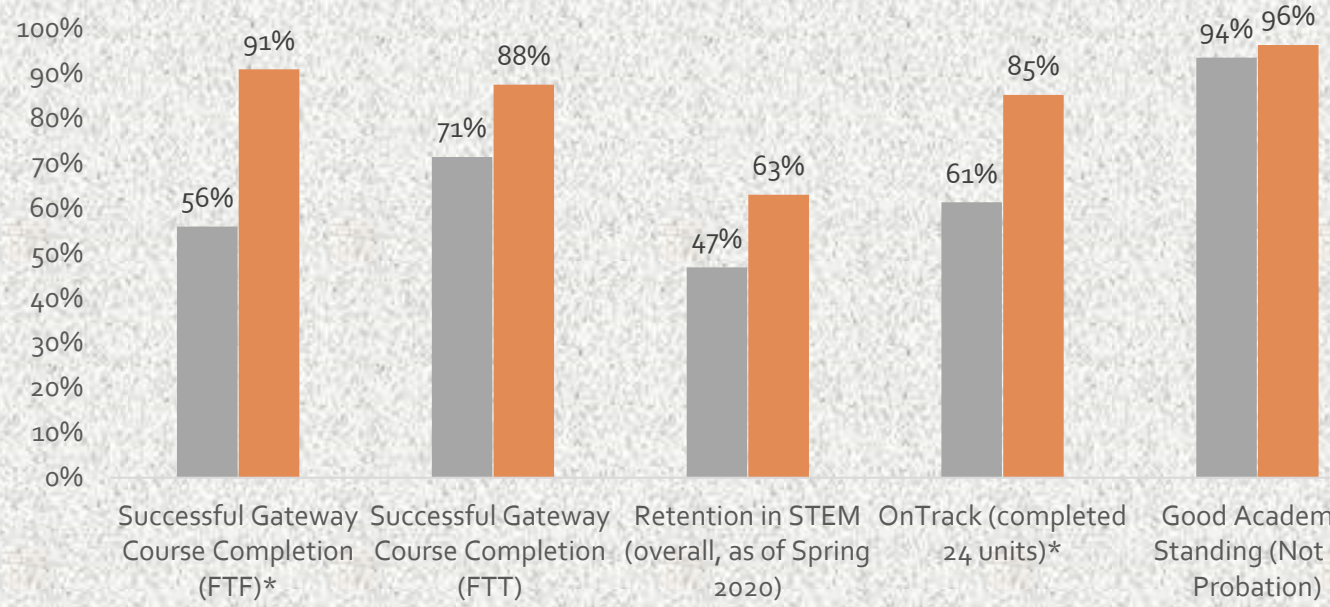
AIMS² *Program Participation*

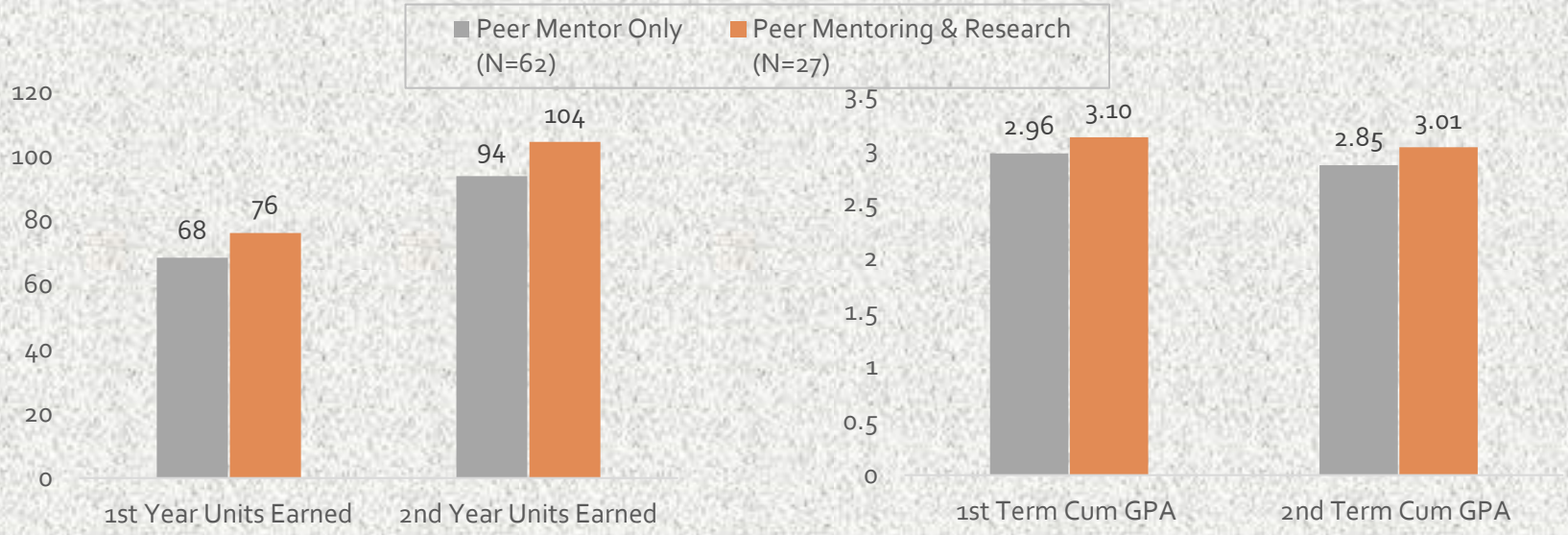
	N	Faculty Mentoring	Summer Research	Academic Yr Research	Peer Mentoring 2018-20
Cohort 1, 2016 Fall	22	22	18	12	
Cohort 2, 2017 Fall	35	35	11	17	
Cohort 3, 2018 Fall	52	52	12	19	47
Cohort 4, 2019 Fall	42	42	0	10	42

AIMS² Program Participation

Outcomes **among AIMS² students** with regard to program type (e.g. research, peer-mentoring etc.). Limited to 2018 and 2019 cohorts.

Finding: Those who participated in both research and peer mentoring had higher success than those who participated in Peer mentoring only.





(*) statistical significance ($p<.05$) between Peer Mentoring only, and Peer Mentoring & Research group

Summary of Findings

- **Program Components**
  Research component, holding other variables constant, trended towards better outcome measures.

- AIMS² participants are outperforming matched, control group on all outcome measures among freshmen and transfers.
- Statistically significant differences in 9 outcomes for Freshmen and 5 for Transfers.

	Freshmen (9)	Transfers (5)
Gateway Course completion	Successful Gateway Course Completion	Successful Gateway Course Completion
Persistence in STEM	Retention in STEM (2nd term, fall to spring)	Retention in STEM (2nd term, fall to spring)
	Retention in STEM (overall)	
OnTrack	Completed 24 units end of yr 1 & yr2	Completed 24 units end of yr 1 & yr2
	Number of Units Earned 1st year	Number of Units Earned 1st year
	Number of Units Earned 2nd year	
Good Academic Standing	Good Academic Standing (Not on Probation)	
	Cumulative GPA 1st term	
	Cumulative GPA 2nd term (N)	Cumulative GPA 2nd term

What has gone well?

With regard to the outcome measures, AIMS^2 has effectively served its target population – underrepresented groups in STEM, among both freshmen and transfer students.

Areas of increased focus.

Support expanding the research component of the program given the small sample sizes.

Allow for additional time to track degree completion outcomes.

Create a tracking system to see if these short-term outcome measures are sustained over a longer period of time .

Consider additional endogenous factors that may be influencing the outcomes (campus engagement, additional support etc.)

Thank you

Attract Inspire Mentor Support Students
AIMS2
HSI STEM Grant Program

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DISCUSSION ITEMS

- Faculty Reports– Faculty Mentors
- Project Activities in NCE year – CC Project Partners and CSUN
- CSUN (Student Services) – Josefina
- Adjourn

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Cohort Roster (1-5)

Ali Amini		
Mehdi	Miri	T-5
Ashley	Kuhnley	T-4
Sabrina	Motto	T-5
Elvis	Chino-Islas	F-3
Kimberly	Ortiz	F-3
Lavar	Watkins II	F-4
Javier	Valle	T-5
Mario	Giron	T-5
Suzanne	Fisher	T-5

Anwar Alroomi		
Alexis	Sierra	F-2
Leonard	Fitzpatrick	T-5
Oscar	Lopez Bahena	T-5
Iris	Guerrero Morales	F-4
Jonathan	Salcedo-Manriquez	T-4
Juan	Espericueta	F-3
Luis	Flores	F-4
Teny	Shahjahanian	F-2
Marleny	Lopez	T-5

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Cohort Roster (2-5)

Bingbing Li		
Abraham	Meiszner	T-4
Andy	Sanchez	F-3
Anthony	Vasquez	F-3
Eswin	Amaya	F-3
Andrew	Ramirez	T-5
Deion	Shallenberger	T-5
Jason	Kim	F-3
Gerardo	Baron Diaz	T-5
Randy	Herrera	T-5
Tomothy	Tran	T-5
Megan	Ngo	F-3
Noe	Diaz	T-4

Bruno Osorno		
Beatriz	Acuna	F-1
Albert	Rivas	T-5
Erica	Garcia	F-4
Fernando	Landeros	F-3
Cesar	Villa	T-5
Hector	Mata	T-4
Faizan	Hussain	T-5
Jessirae	Bufford	T-5
Jose	Cervantes	F-3

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Cohort Roster (3-5)

Ruting Jia		
Areesha	Hussain	F-4
George	Lopez	F-4
Jairo	Zelaya	T-4
Joshua	Alvarado	F-4
Meyer	Millman	F-3
Pedro	Moran	F-4
Tiffany-Ziba	Haghighi	F-3
George	Lopez	F-4
Kelvin	Martinez	T-5

Kay Hao		
Ezekiel	Castelo	T-5
Ariana	Oliva	T-5
Andrew	Langwald	F-2
Gerardo	Reyes	F-3
Peter	Messiha	F-3
Richard	Gomez	F-3
Alexander	Rivera	T-4
Elizabeth	Esquivel	T-4
Jennifer	De Avila	T-4
Richard	Rivas	T-4

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Cohort Roster (4-5)

Aram Khachatourians		
Armando	Briseno	F-2
Ashley	Frisch	F-4
Cristina	Rubalcava	T-4
Garabed	Simitian	F-3
Jason	Marroquin	F-4
Kathleen	Molina	F-3
Lesly	Custodio	T-4
Levi	Velasquez	F-2
Adrian	Santamaria	T-5
Daniela	Sanchez	T-5
Heather	Reyes	T-5
Matthew	Awad	T-5
Matthew	Culajay	T-5

Behzad Bavarian		
Anthony	De Leon	T-4
Emilio	Aguilar	T-4
Meroujan	Bagdadian	T-5
Jasmin	Ortiz	T-5
Stefany	Fuentes Melgar	T-5
Verania	Ceja Franco	F-2

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Cohort Roster (5-5)

John Valdovinos		
Alan	Cruz	F-2
Armando	Herrera	F-2
Alyssa	Tompkins-Webb	T-5
Jozsef	Feher	T-5
Kyle	Rietta	T-3
Nuelbella	Sandoval	F-3
Jessica	Frederich	T-5
Rojelio	Bejar	T-4
Luis	Ochoa	T-5
Maria	Zinkewich	T-5
Robert	Salone	T-5

Kyle Dewey		
Briana	Pimentel	F-3
Eileen	Quiroz	F-2
Fernando	Vargas	F-3
Isaiah	Martinez	F-3
Jennifer	Glover	T-4
Kavya	Manohar	F-2
Miguel	Hernandez	F-4
Rocio	Zavala	F-2
Samantha	Ramirez	F-4
Victor	Pineda	T-3
Hanna	Zelaya	F-1

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DISCUSSION ITEMS

- Faculty Reports– Faculty Mentors
- Project Activities in NCE year – CC Project Partners and CSUN
- CSUN (Student Services) – Josefina
- Adjourn

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- Adjourn

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