



Improving Success for Diverse Students in STEM

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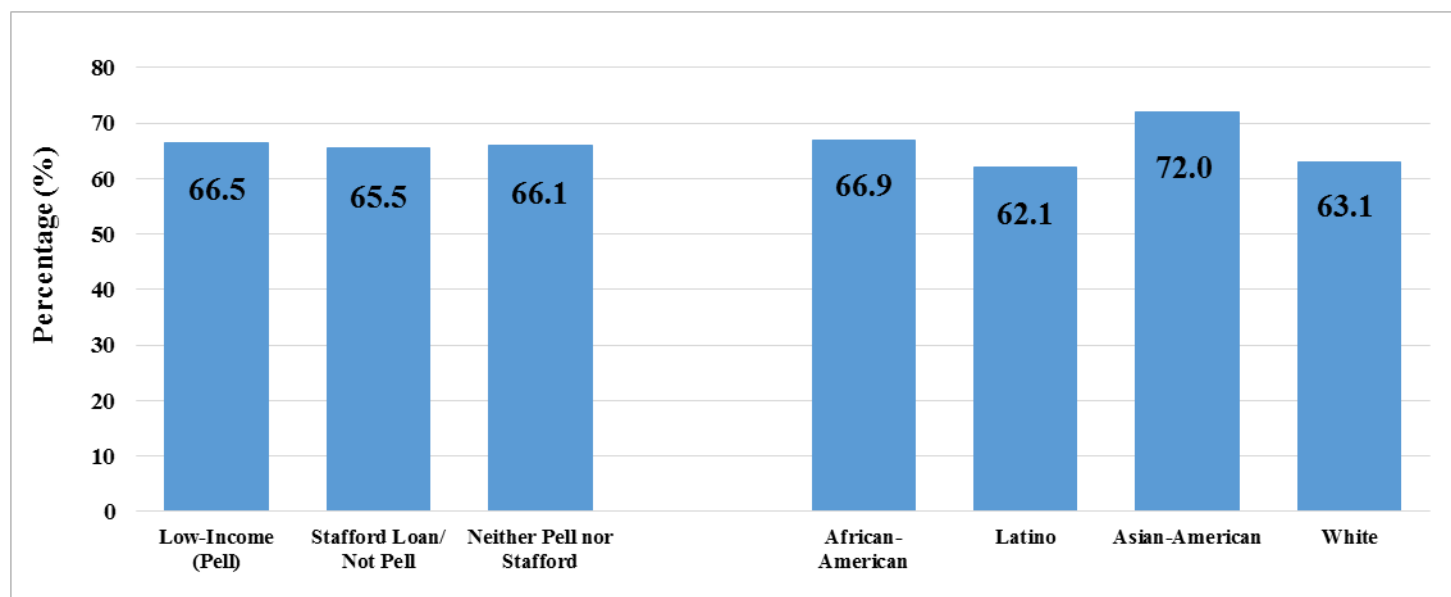
Divisional Dean of Student Academic Affairs

**College of Natural and Agricultural Sciences
(CNAS)**

U. C. Riverside

UCR is unique among UC campuses in its equity of campus graduation rates

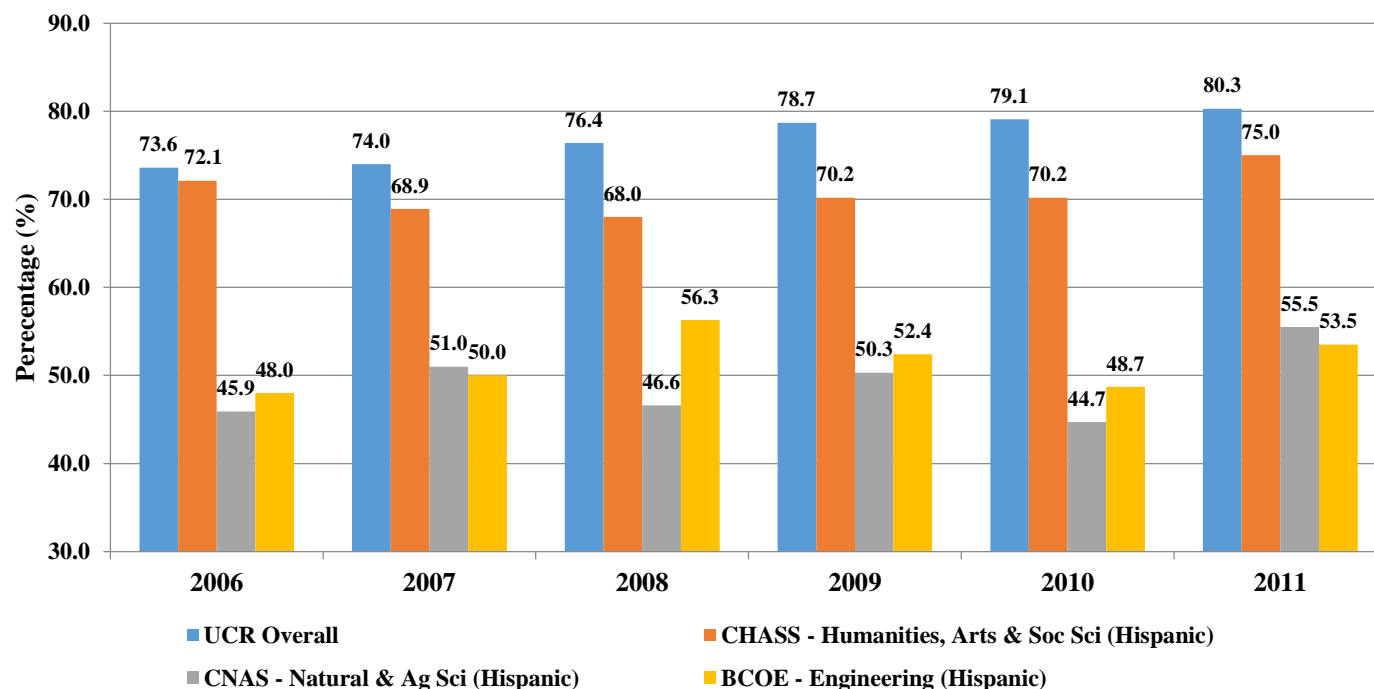
6-Year Graduation Rates by Socio-Economic Status and Race-Ethnicity, 2006 Cohort



Source: UCR Strategic Academic Research and Analysis (2013)

However, in STEM majors retention of freshmen is lower for under-represented students

Second-Year Retention by College and Hispanic Ethnicity, 2006-2011



Source: UCR Strategic Academic Research and Analysis (2014)



Student Success Initiatives

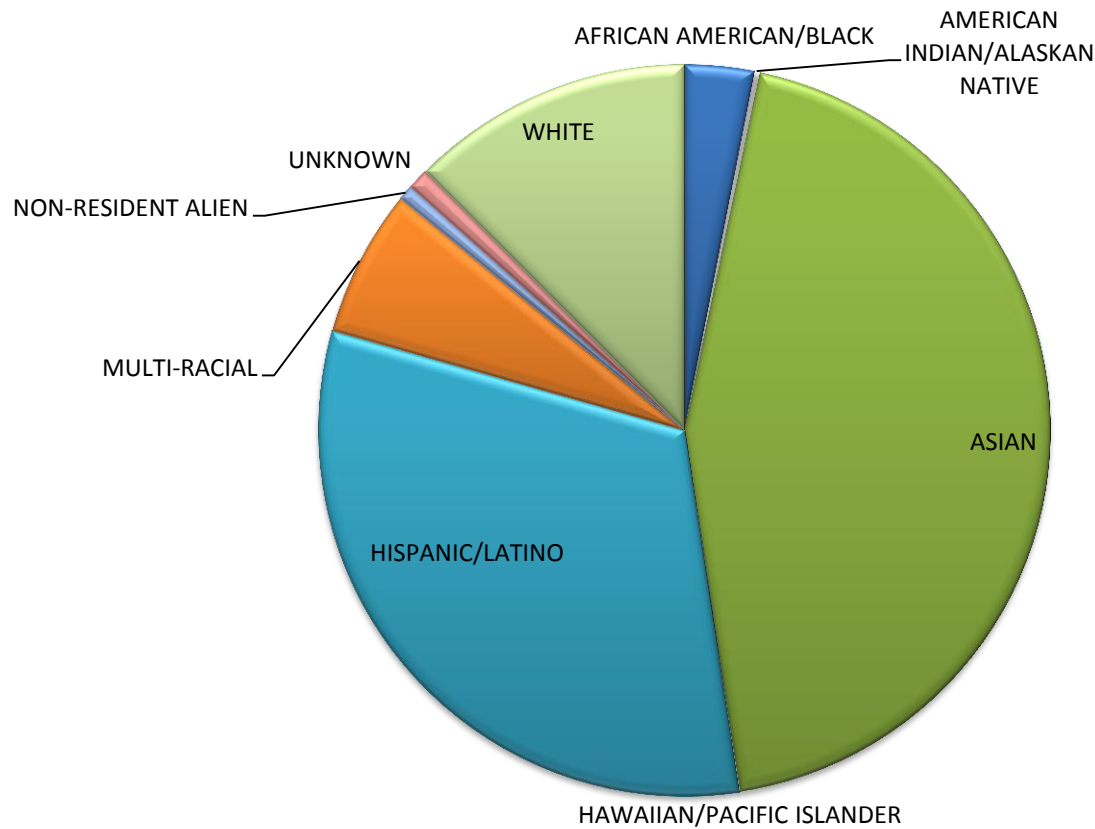
For this reason, the Science college (CNAS) has focused many of its academic interventions at the **lower division** (freshmen, sophomores).

To create effective interventions, we must understand the **demographics** of our freshmen and the **challenges** that they face in finishing STEM majors.



Demographics of the Science College at UCR

CNAS Freshmen Ethnicity 2014



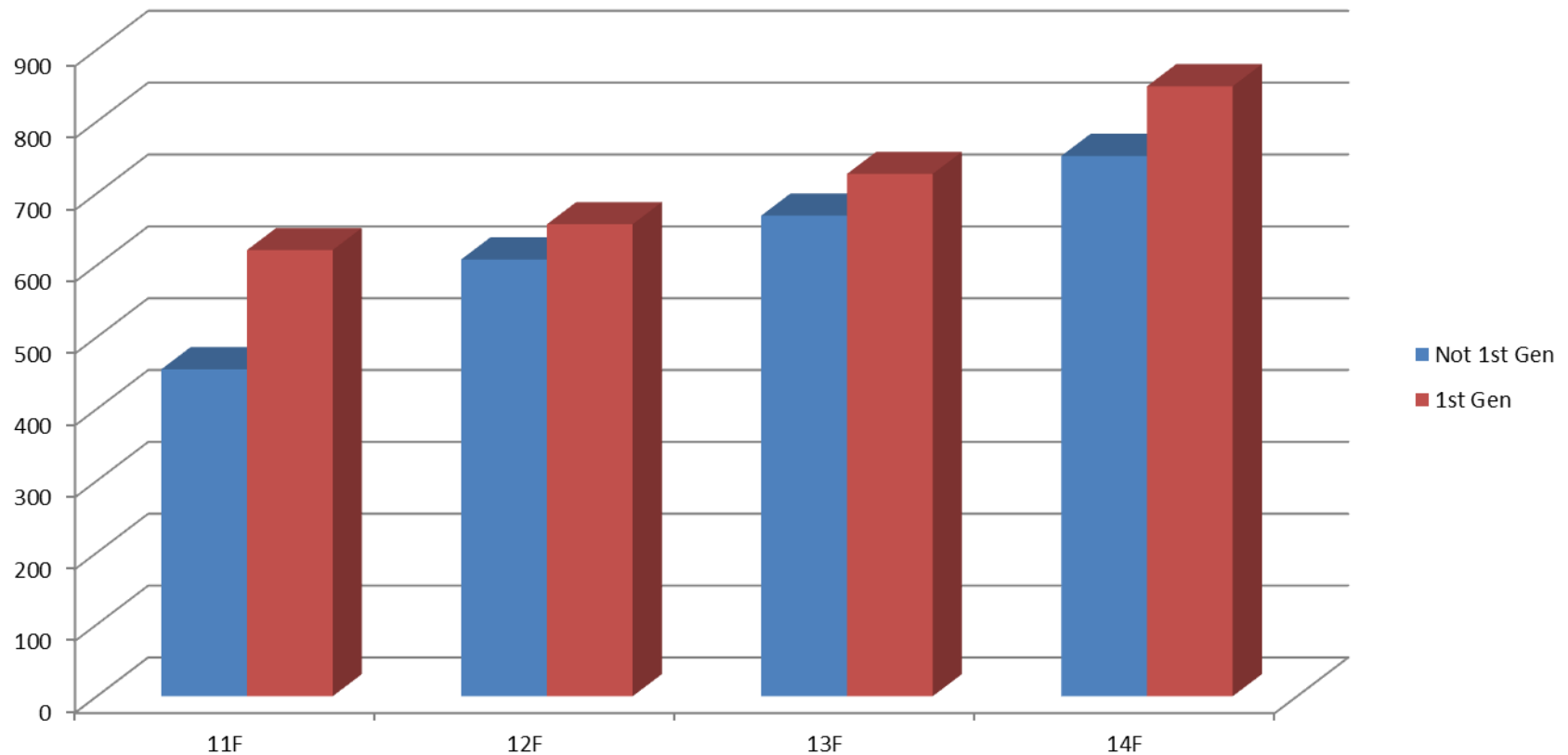
CNAS is the most diverse Science college in the UC system



Demographics of the Science College at UCR

CNAS Enrollment by 1st Generation

Freshmen





Socio-Economic Challenges

- **Low-income** – many need to work part-time, summer session is too expensive
- **First-generation** – have no role models at home for guidance on being a science student and STEM professional
- **Under-represented** – see few in the STEM faculty and professions who look like them, making it harder to visualize their career opportunities



Academic Challenges

- They are away from home for the first time, with many new **distractions**.
- Their new peer group at UC is **much more competitive** than their High School peers.
- The quantitative skills needed to master STEM subjects require **intense study time** (2 hours outside of class for every hour in class): **16 units + 32 hours = 48 hours/week!**



Intervention Strategies in CNAS

- **Summer Bridge Math Preparation** before UC matriculation - but not everyone can afford it.
- **Learning Communities** – create a social and academic support group to help new Freshmen transition to college.
- **Early Research Engagement** – expose them to the excitement of scientific methods and discovery as early as possible.
- **Early Career Exploration and Mentoring** by near-peers and alumni – role models.



First-year Learning Communities - facilitating the critical transition

- › Place incoming Freshmen with similar math placements and majors into **cohorts of 24 students**.
- › Take the same math and core science courses **all year long** as a cohort.
- › **Peer tutoring** in math and science courses throughout their first year.
- › **Faculty mentoring** and **academic advising** seminars in Fall.



Faculty mentoring on science and careers – learning that faculty are approachable, and focused on research as well as teaching



Academic advising on curriculum planning – learning to trust their advisor, so they are more willing to go to them when they need help





First-year research engagement

- › Biology 20: The Dynamic Genome (dna extraction and gene sequencing) – for Life science majors
- › Chemistry 95: Explorations in Molecular Science (computer modeling and field sampling of atmospheric gases) – for Physical/Mathematical science majors

Hands-on, active learning laboratory research (24 students/class) conducted *alongside* their large introductory Biology and Chemistry courses (300-600 students/class).



Focuses on teamwork, group problem-solving, public speaking and professional development



January 10, 2015

AGENDA



Sophomore Career Mentoring

Alumni and Peers

Time	Program
9:00 a.m.	Registration & Continental Breakfast (HUB Lobby and HUB 302)
9:30 a.m.	Welcome <ul style="list-style-type: none"> Mike McKibben, Divisional Dean, CNAS Student Academic Affairs Sean Gil, Director, UCR Career Center
9:40 a.m.	Career Panel #1: Industry & Technology (Moderator: Helen Chen, Ambryx Biotech) <ul style="list-style-type: none"> Sean Gallagher, UV Products Allison Mackenzie, ES Babcock Karen Caplan, Frieda's Inc. John Leonard, Vaccinex
10:20 a.m.	<ul style="list-style-type: none"> John Rau, Ultra-Research, Inc. John Perchorowicz, Triage Masters Phil Harnage, Disney, et al. Leslie Hickle, BioAtla LLC
11:10 a.m.	Break
11:20 a.m.	Career Panel #2: Academia, Government and Health Professions (Moderator: Christine Victorino, Assistant Vice Provost for Undergraduate Education) <ul style="list-style-type: none"> Gabriel Lopez, UCLA School of Medicine Sharon Wilczynski, City of Hope Medical Center Charlie Scruggs, UCR Health Professions Advising Center Ann Sturdivant, SARWQCB Don Suarez, USDA-ARS Salinity Laboratory
12:20 p.m.	Table-hop Networking Lunch (switch tables every 30 minutes) (Moderator: Christopher Bell, Assistant Director of Recruitment, Keck Graduate Institute) <ul style="list-style-type: none"> All of the panelists from the morning sessions Michelle Brown, Olfactor Labs UCR undergraduate students
1:45 p.m.	Career Panel #3: Getting Involved in Undergraduate Research (CNAS Science Ambassadors and UCR Chancellor's Fellows) (Moderator: Scott Silverman, CNAS Scholars Coordinator) <ul style="list-style-type: none"> Andrew Munoz (Junior, Biology) Connor Richards (Junior, Physics) Hanni Schoniger (Junior, Biology) Geoffrey Pronovost (Senior, Biochemistry) Brandon Phong (Senior, Biology) Michael Baird (Sophomore, Chemistry)
2:30 p.m.	Break
2:45 p.m.	Career Center Skill Building Workshop: Beyond Just a Conversation
4:00 p.m.	Closing Remarks & iPad Mini Raffles <ul style="list-style-type: none"> Career Center: Reflection & Next Steps College of Natural & Agricultural Sciences – Mike McKibben



Impact of the Learning Communities

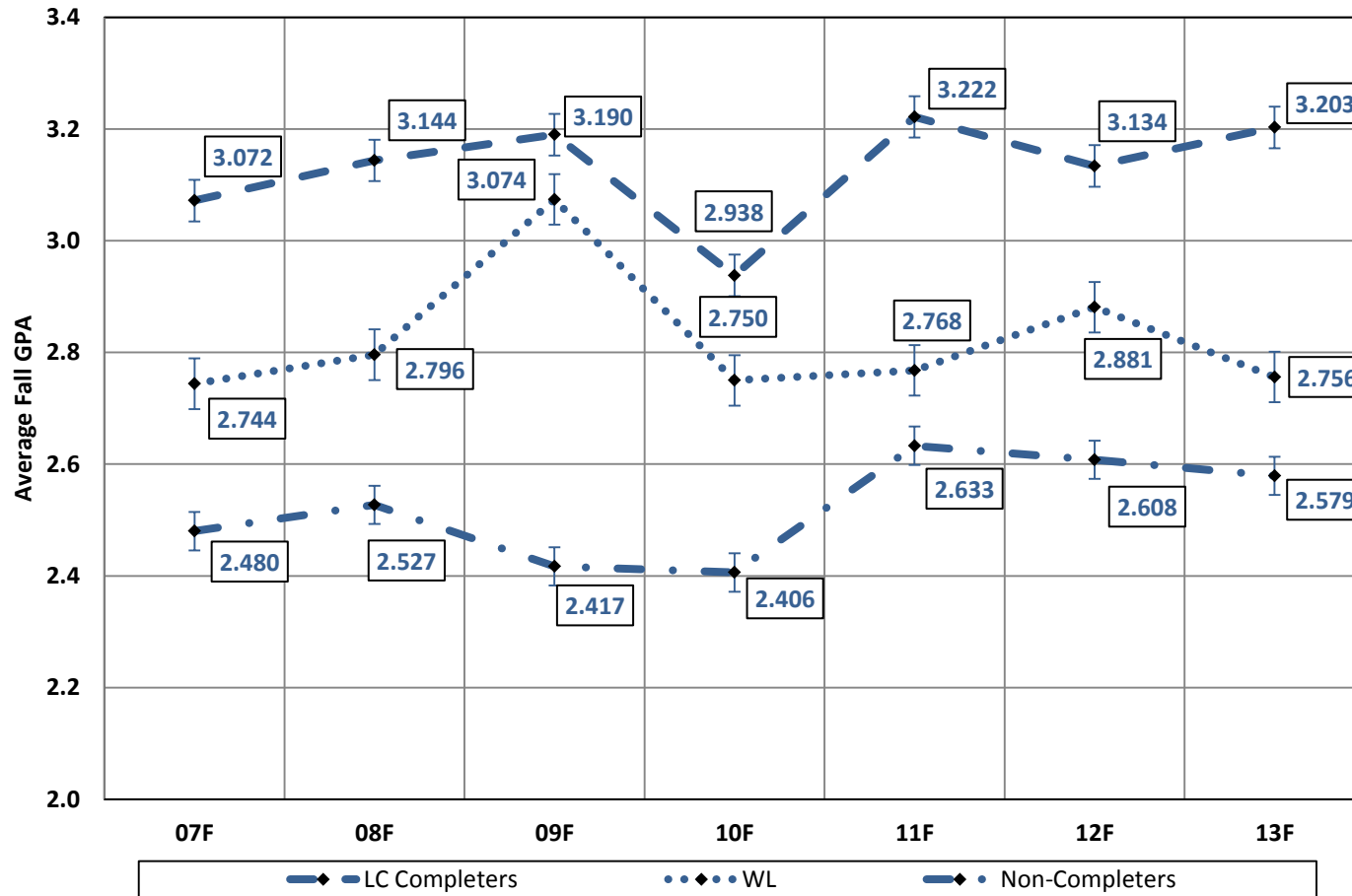
– some background facts

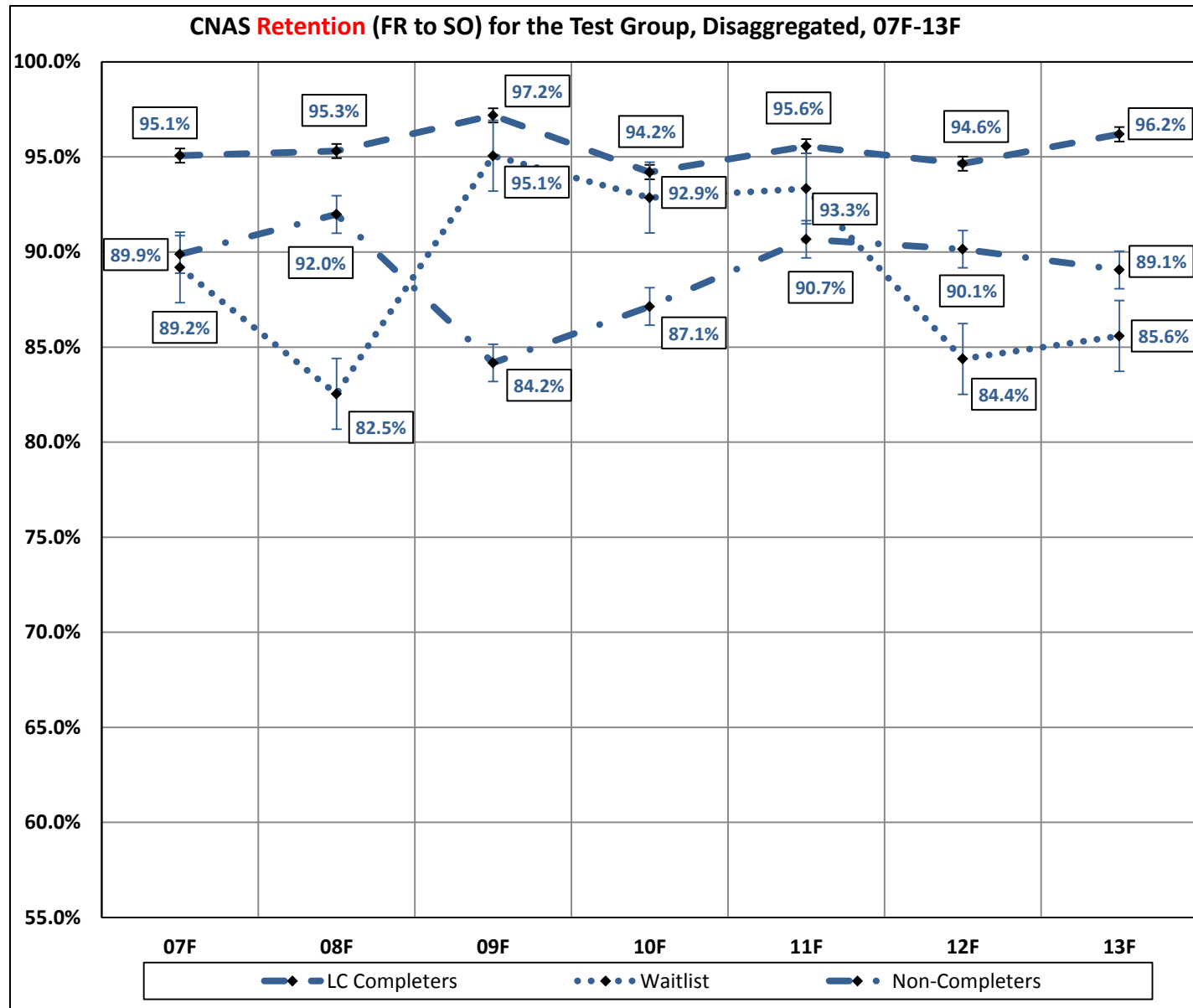
Nationally, the graduation rates in STEM majors at four-year US institutions are:

25% after 4 years

40% after 5 years

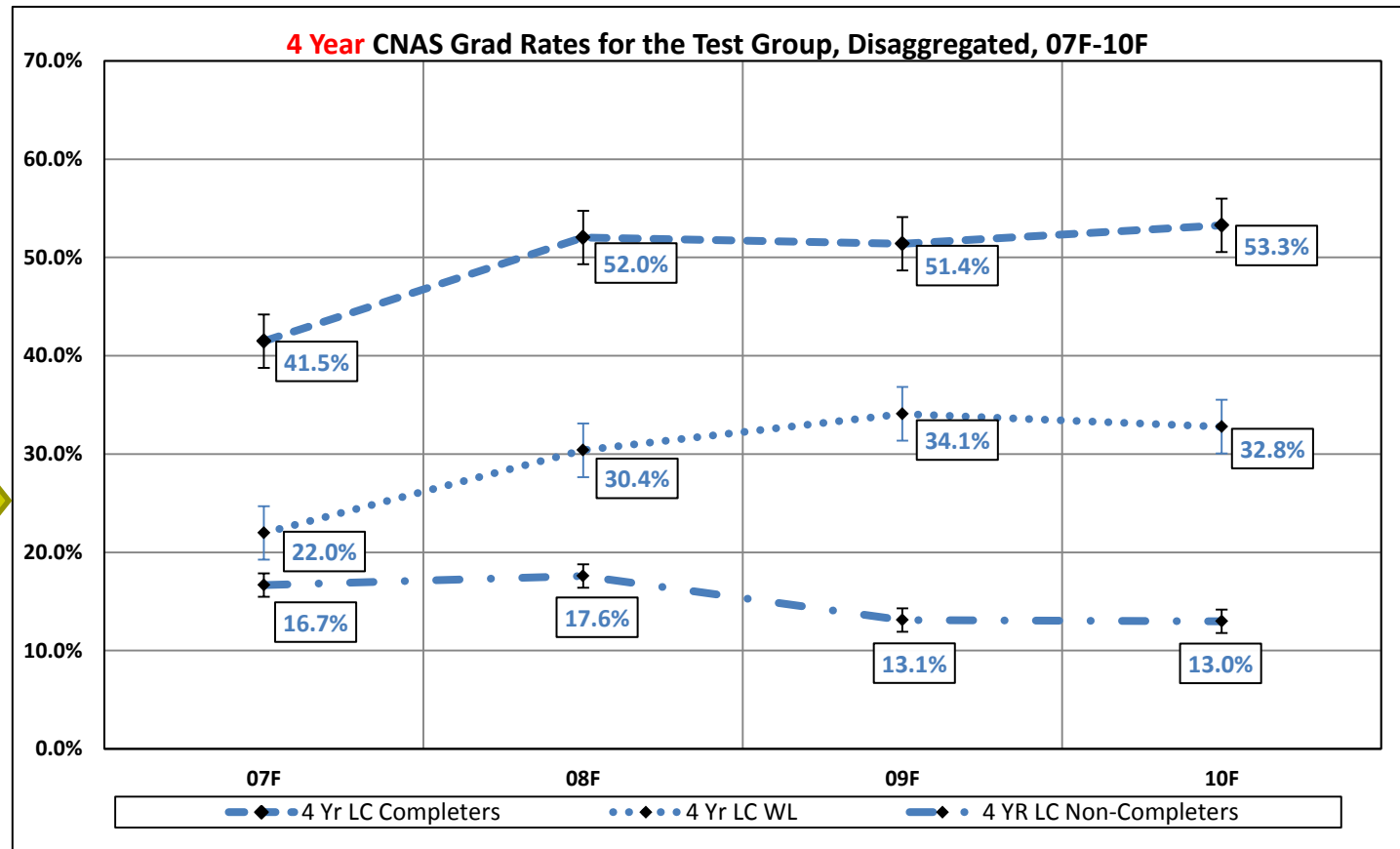
More than half of aspiring STEM students **do not graduate** in STEM.

**Average First Term GPAs for the Test Group, Disaggregated, 07F-13F**





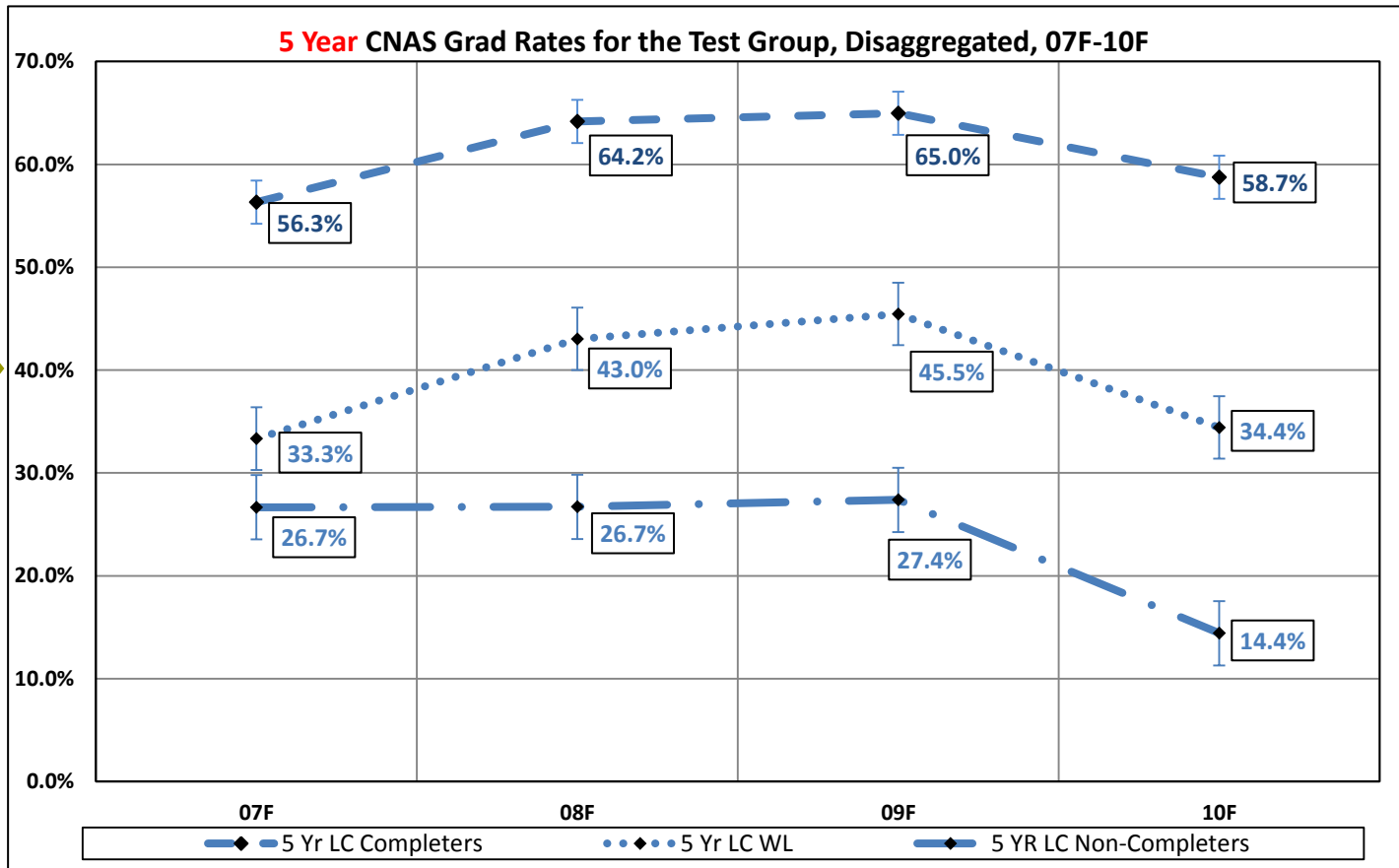
US Avg →

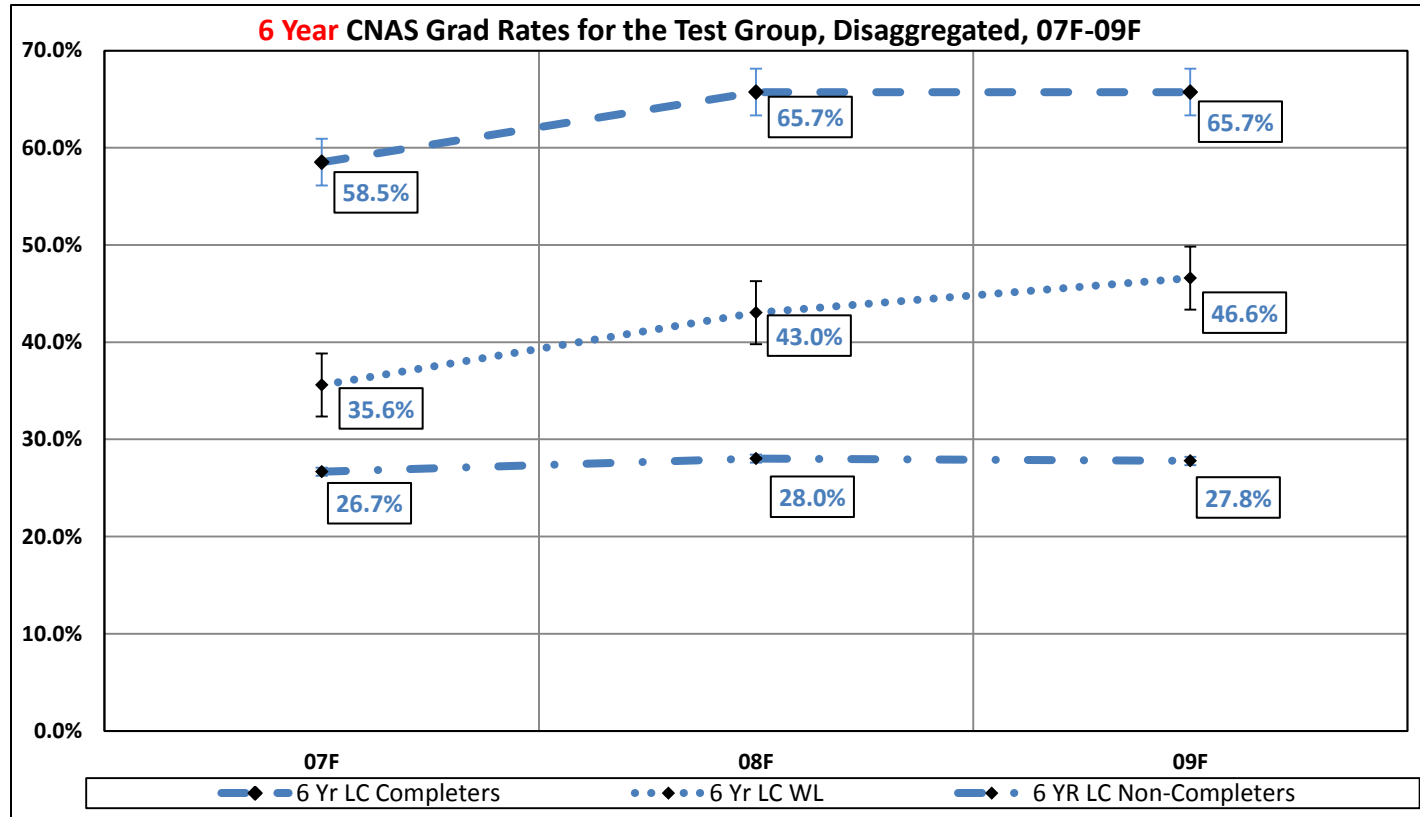


Doubling of 4-year graduation rates over the national average



US Avg →





These 6-year rates in CNAS LCs are **the same** as the campus rates!



Federal grant support of CNAS' student success programs:

2013: National Science Foundation awarded CNAS \$2.0 M for 5 years to expand its freshman learning community program.

2014: Howard Hughes Medical Institute awarded CNAS \$2.4 M for 5 years to support early research and career engagements for its freshmen and sophomores.

