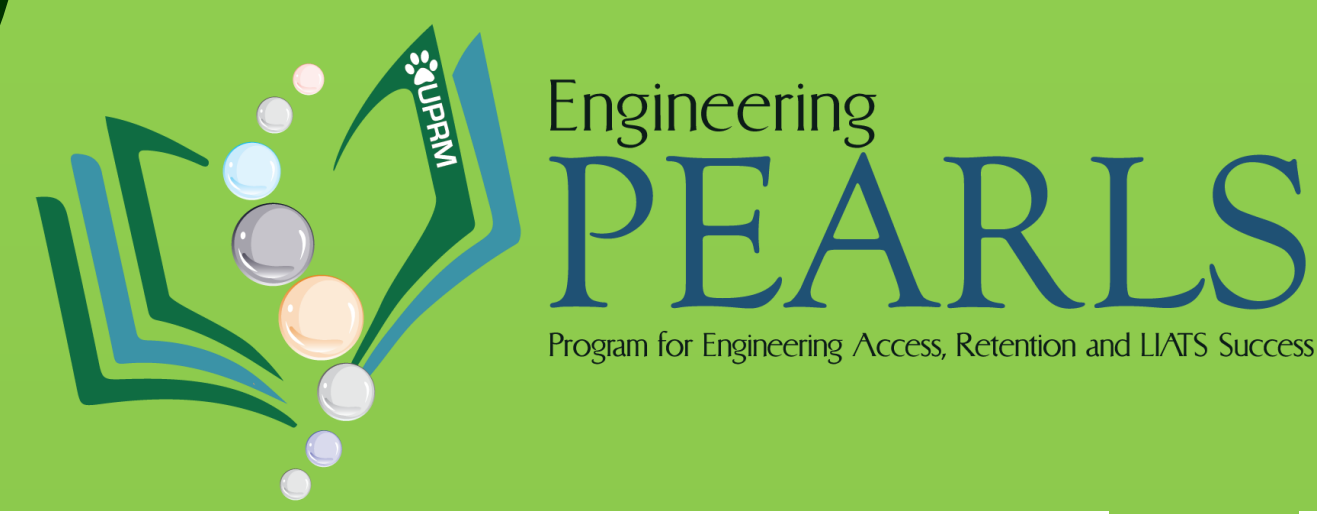




# ePEARLS: A Program for Recruiting, Retaining, and Engaging Academically Talented Students from Economically Disadvantaged Groups into a Pathway to Successful Engineering Careers



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## 1 Introduction

This project, shorthanded PEARLS (Program for Engineering Access, Retention, and LIATS Success), or ePEARLS, investigates the effectiveness of an institutional intervention model seeking to increase the retention and success of low-income, academically talented students (LIATS).

## 2 Problem Background

The College of Engineering (CoE) at the UPRM enjoys modest retention and persistence statistics in its five-year long programs. However, other statistics call for renovated efforts:

- Graduation rates at 150% time have been in decline, falling from 67% in 2006 to 56% in 2016
- On-time graduation rates have also dropped in that period from 21.2% to 5.0%.

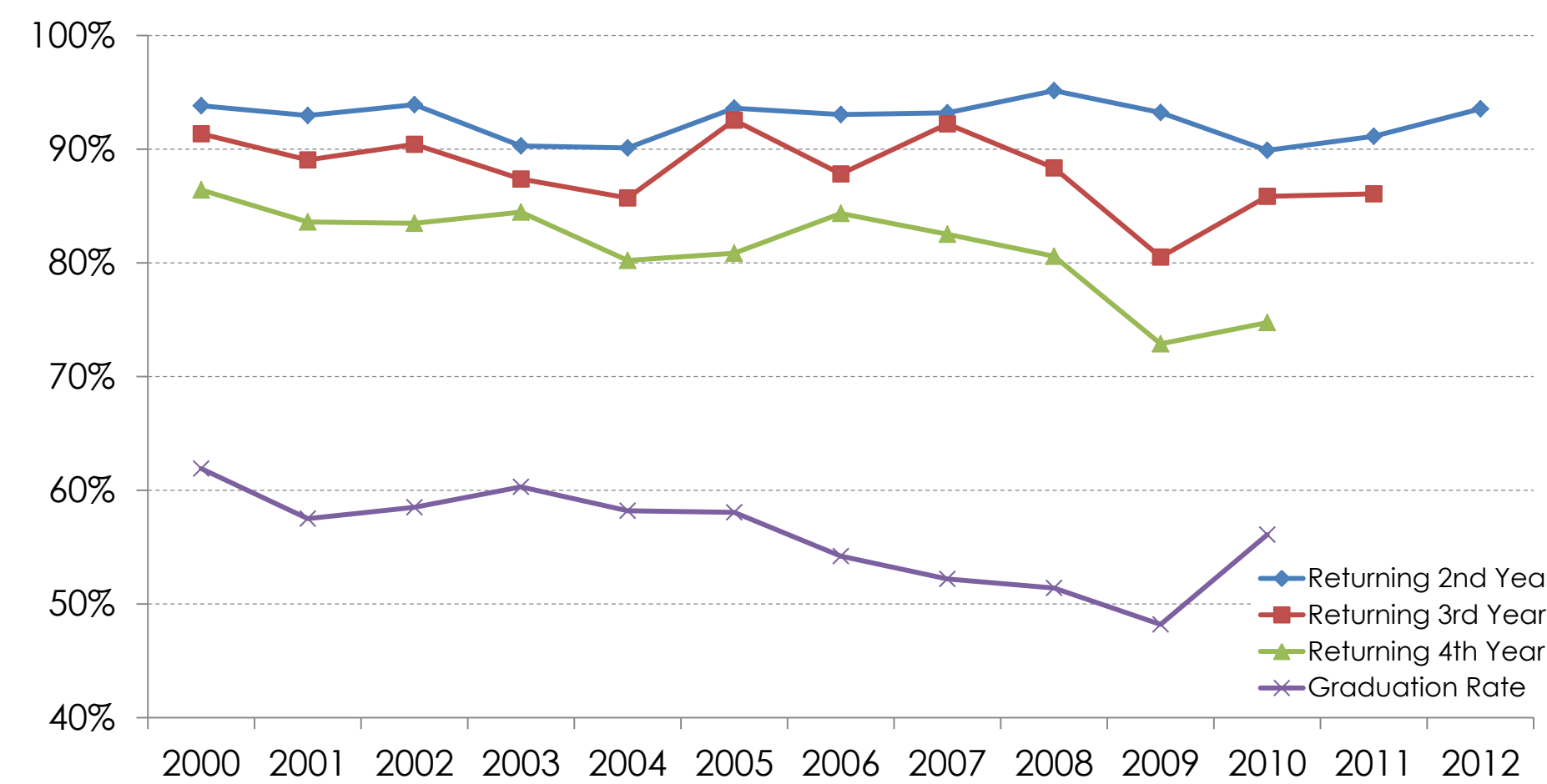


Figure 1: Retention, persistence, and graduation rates for UPRM CoE students.

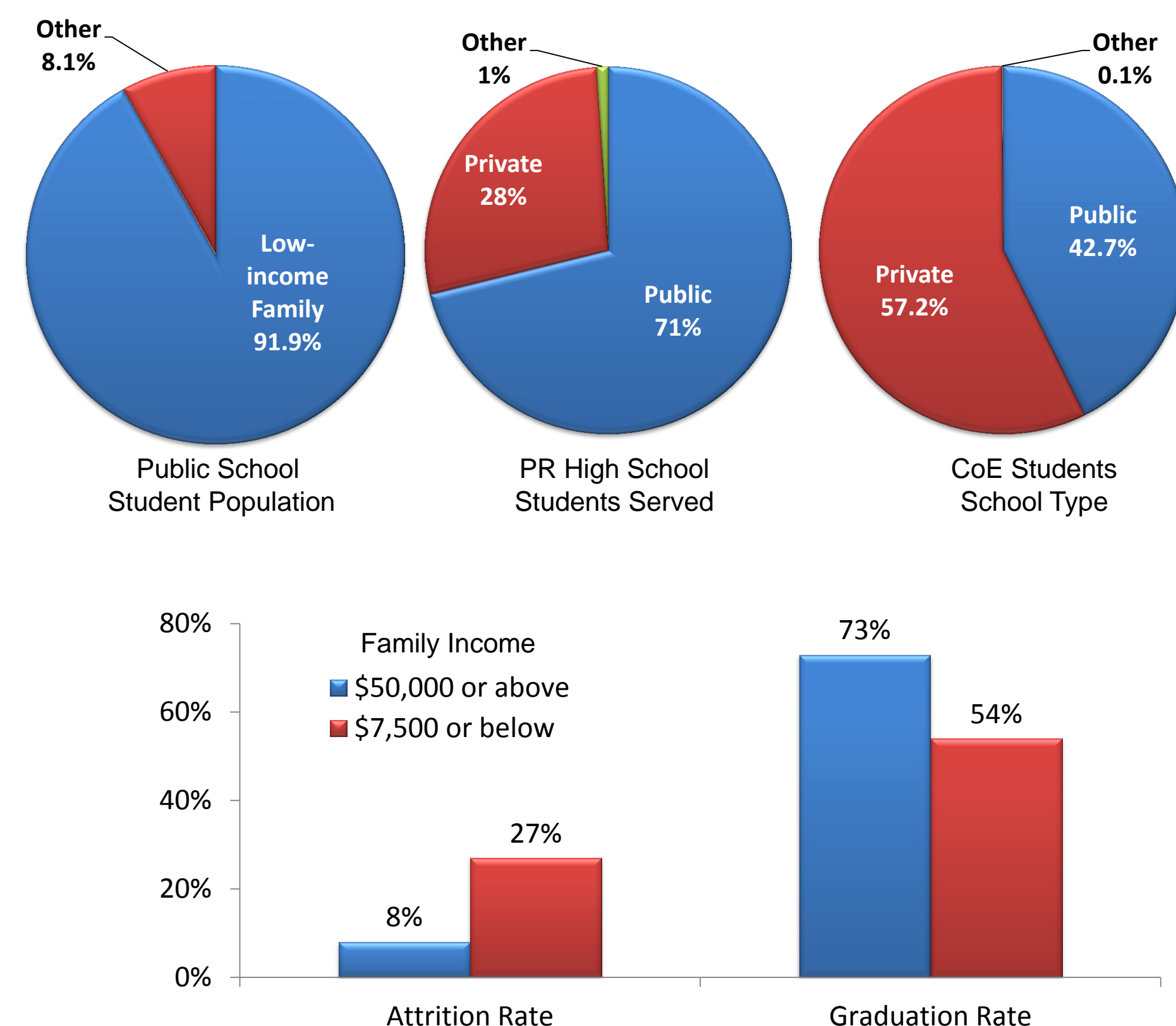


Figure 2: Student family-income and school type contrasts.

## 3 ePEARLS Objectives & Vision

- Increasing the retention and success of low-income, academically talented students (LIATS) in engineering programs at the UPRM
- Researching a hybrid intervention model that combines:
  - Elements from social cognitive career theory
  - Attrition mitigation strategies
  - A framework provided by a structured scholarship program
- The project vision is providing guidelines for institutional policies and practices aimed at improving LIATS success

## 4 Metrics for LIATS Success

Success Indicators include:

- Retention
- Persistence
- Time to graduation
- On-time graduation
- Graduation rates
- Successful insertion into grad school or the workforce



## 5 Theoretical Framework: The L-CAS Model

The LIATS College Access and Success Model (L-CAS) can be viewed as a structure that integrates a set of institutional interventions addressing individual's traits.

Based on Tinto's studies on attrition mitigation and Lent's Social Cognitive Career Theory, the L-CAS model seeks to answer the fundamental research question:

*How effective is the proposed L-CAS model in improving engineering LIATS retention and success?*

Longitudinally, the L-CAS model is arranged in five stages that include:

- LIATS Background Experiences
- Belonging Intervention
- Formation Intervention
- Growth Intervention, and
- Graduation & Performance Achievements

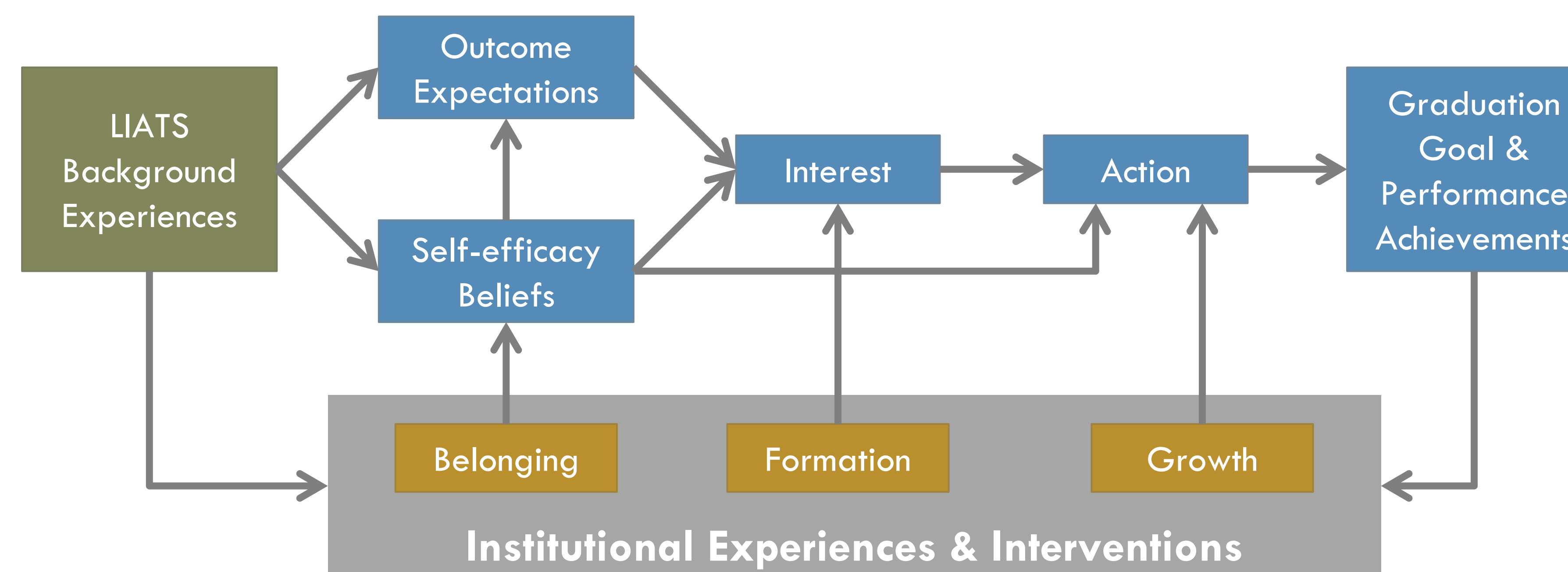


Figure 3: LIAT College Access and Success Model (L-CAS)

## 6 Project Schedules & Activities

Table 1: Scholarship schedule

Student Level	S-STEM Year					Total 5-yr
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	
Freshmen	13	13	13	13	13	65
Sophomore	13	13	13	13		52
Junior	13	13	13			39
Graduate	4	4	4	4	4	20
<b>Total</b>	<b>43</b>	<b>43</b>	<b>43</b>	<b>30</b>	<b>17</b>	<b>176</b>

Table 2: Mentorship schedule

Area	Mentor	Mentored Students					Total
		Yr1	Yr2	Yr3	Yr4	Yr5	
Civil Engineering & Surveying	Carla Lopez	9	9	9	6	3	36
Industrial Engineering	Lourdes Medina & Sonia Bartolomei	6	6	6	4	2	24
Mechanical Engineering	Pedro Quintero	6	6	6	4	2	24
Chemical Engineering	Nelson Cardona	6	6	6	4	2	24
Electrical & Computer & CIC	Nayda Santiago & Manuel Jimenez	12	12	12	9	6	51
Materials Science & Engineering	Marcelo Suarez & Aidsa Santiago	4	4	4	3	2	17
Library Assistance	Anidza Valentin	43	43	43	30	17	176
<b>Totals</b>		<b>43</b>	<b>43</b>	<b>43</b>	<b>30</b>	<b>17</b>	<b>176</b>

Table 3: Schedule of scholarly activities

Activity	Credits	Lecturer	Schedule											
			Year 1		Year 2		Year 3		Year 4		Year 5			
			Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring		
INGE 3001	1	M. Jimenez	FY1		X		X		X		X		X	
INGE 3002	1	S. Bartolomei		FY1			X		X		X		X	
INGE 3003	1-2	N. Santiago	SY1	SY1, JY1	FY1, GY1	FY1	X	X	GY3	X	X	X	X	GY5
INTD 3355	3	A. Valentin	JY1	GY1	SY1		FY1	GY3	X		X		X	GY5
Underg Rsch	0-6	N. Cardona			JY1	SY1, JY1	SY1	FY1, SY1	FY1	FY1				
COOP	0-9	P. Quintero		JY1	SY1, JY1	SY1	FY1, SY1	FY1	FY1					
Mentoring	1	L. Medina	GY1		X		GY3, JY1		SY1				FY1, GY5	

## 7 Status and Ongoing Work

Students have been selected to form 3 study groups:

- Participants with scholarships
- Participants without scholarships
- Non-affiliated general student population

Activities are slated to start in Spring 2019

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