Bourns College of Engineering – Annual Meeting June 10, 2016

Celebrating 10 YEARS

REZA ABBASCHIAN

We Engineer Excellence

What do you remember of 2005?

YouTube

Launched – February 2005
By 3 PayPal Employees &
bought by Google for
$1.65 BILLION a year later

Most sought after Christmas toys

LETS GO
NEW ENGLAND
PATRIOTS

Superbowl Champions

May 23, 2005 When Tom Cruise jumped on Oprah's couch

And did you know?

Average price of a new home $297,000

Average median income $46,326

Top Movies

Cost for a gallon of gas $3.18

And what was new in 2005 at BCOE?

Reza Abbaschian is new Dean

September 12, 2005

Reza Abbaschian began his tenure as the new Dean of Bourns College of Engineering today, September 12.

His former position was at the University of Florida, where he was Vladimir A. Grodsky Professor of Materials Science and Engineering and served as Department Chair for 16 years. Under his leadership, the department grew to among the largest in the country in graduate and undergraduate enrollment and research.

His research concentration is in materials processing, including high temperature-high pressure growth of diamond crystals. He has more than 230 scientific publications, four patents, eight patent disclosures and eight books. This month he will become President of ASM International, the largest materials society in the United States.

For those present at the City Farewell Reception, you may recall that when hired, Reza stood 6 foot 6 inches tall! According to Ravi over the years Reza's dedication has caused great pressure that's what caused him to shrink!

So what other interesting factoids were there for 2005?

BCOE 2005 FACTOIDS	
Number of Undergraduate Students	1275
Number of Graduate Students	291
Number of Faculty	70
Number of Departments	4
Number of Fellows in Professional Societies	29

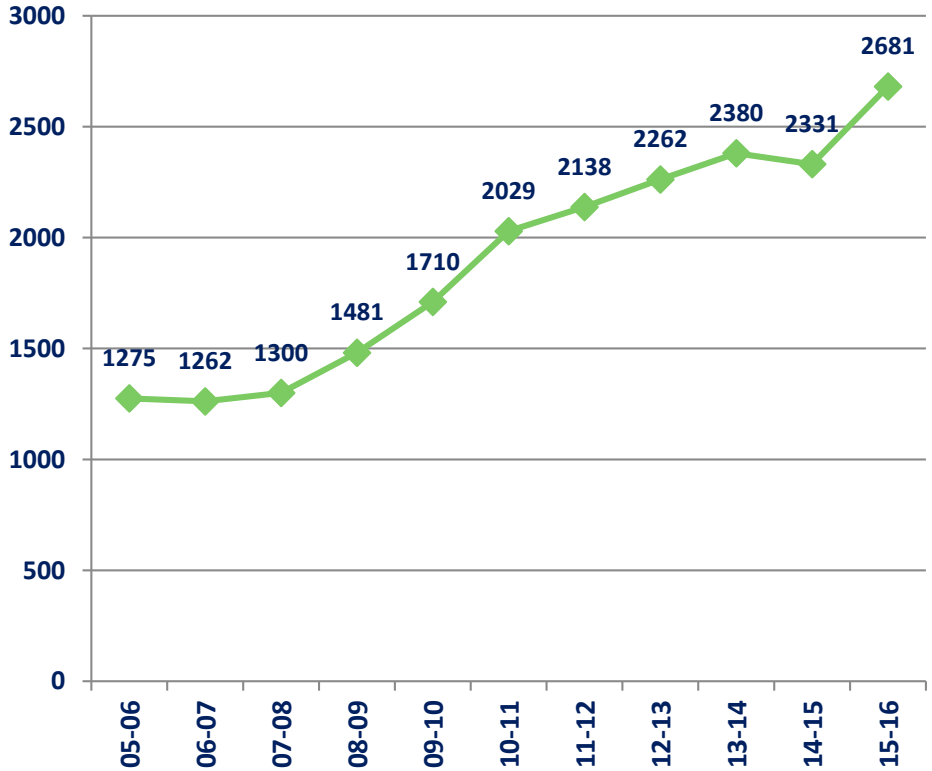
And where are we now??

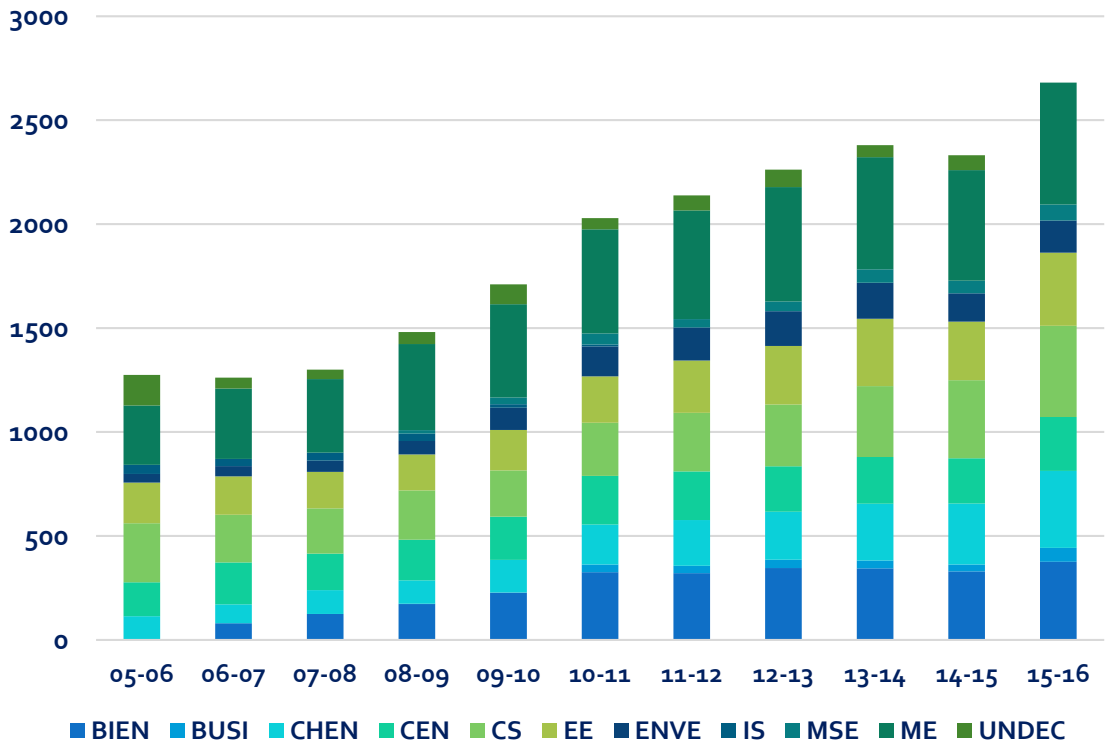
BCOE 2016 FACTOIDS

Number of Undergraduate Students	2681
Number of Graduate Students	747
Number of Faculty	102
Number of Departments	5 + 2 programs
Number of Fellows in Professional Societies	88

Number of Undergraduate Students

But what happened in between? Let's see just how much we rocked!





Sharon will go over in more detail information on Undergraduate Education

Number of Graduate Students

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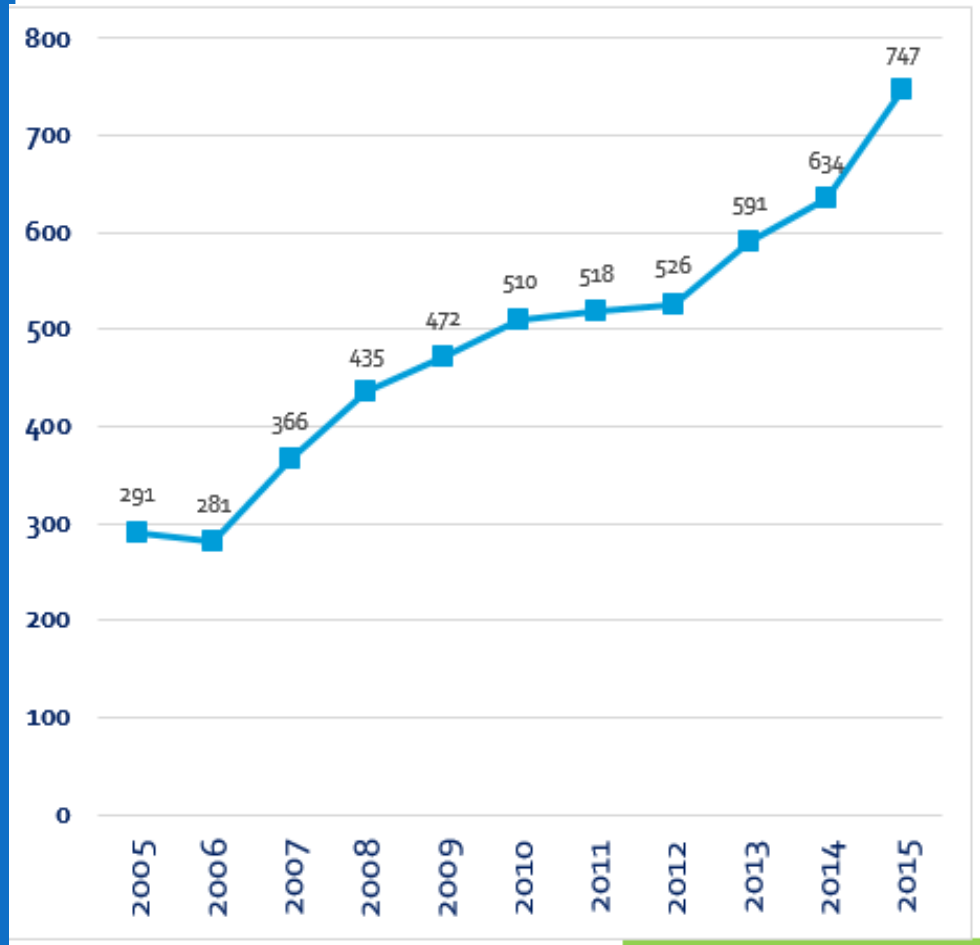
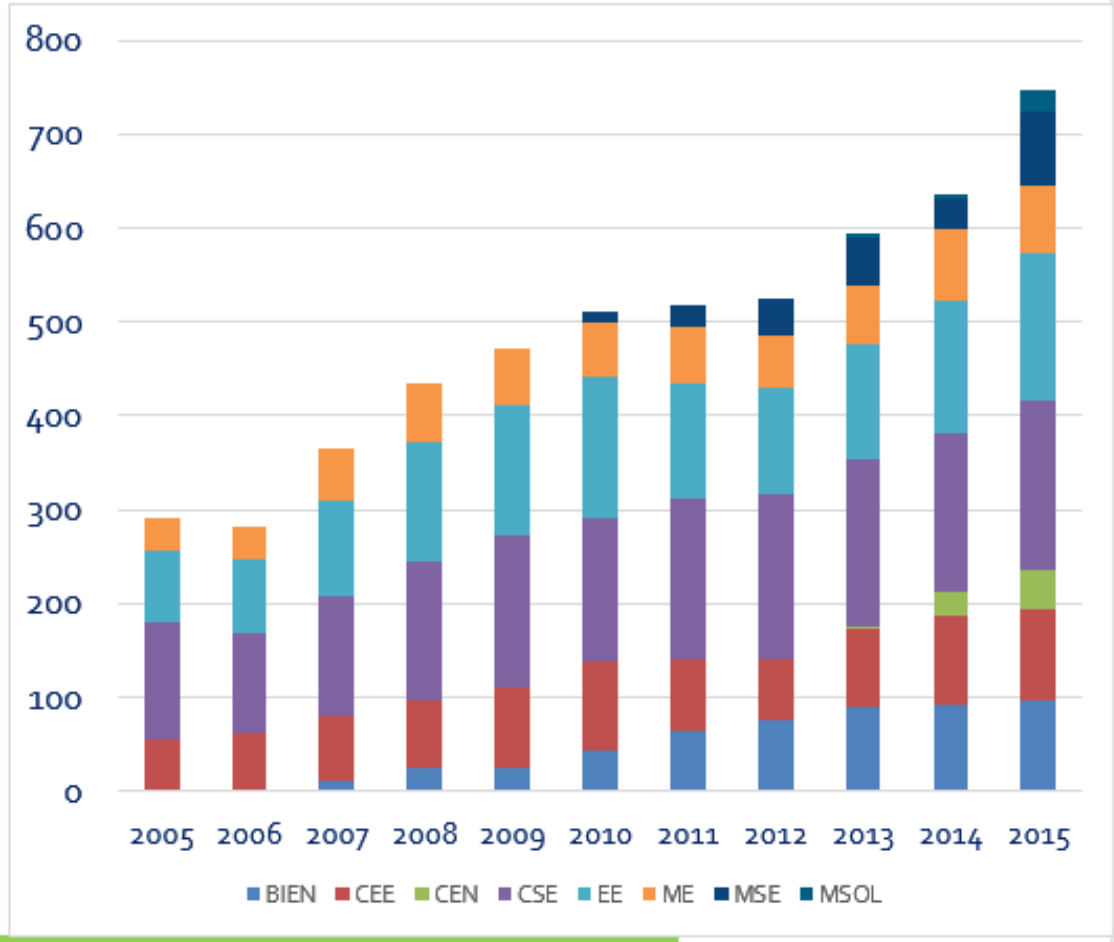
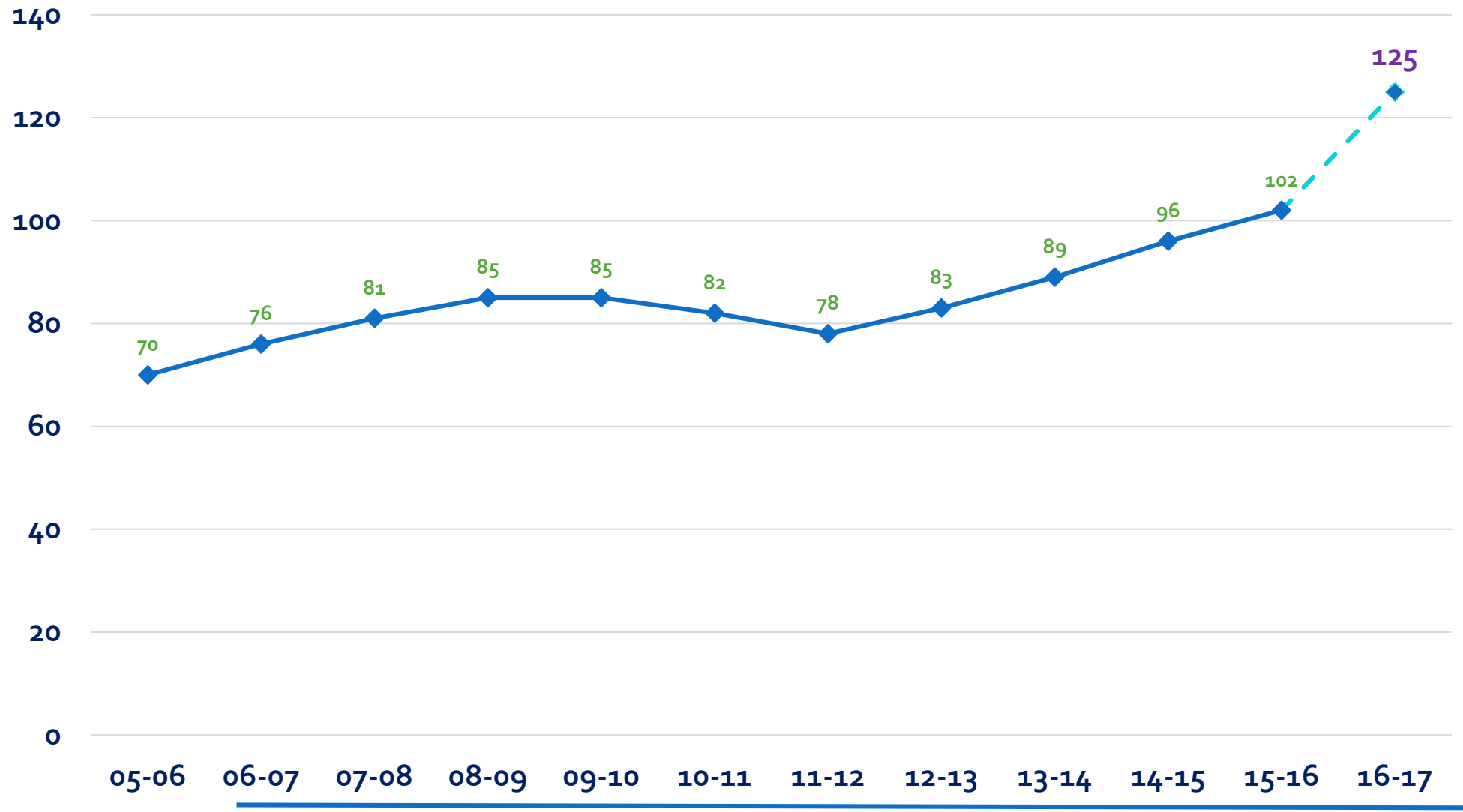




Ravi will go over in more detail information on Graduate Education

Number of Faculty

But what happened in between? Let's see just how much we rocked!



BCOE at a Glance

• U.S. News Ranking	71, top one-third among those ranked (39th among public universities)
• Leiden Ranking	8th among 478 international research universities in natural sciences and engineering
• National Research Council	Top quartile
• Faculty	101 *(goal to increase to 140 by 2020)* *NOTE: Additional 22-25 faculty by Fall 2016*
• Undergraduate Enrollment	2,390 *(projected to increase to 3,000 by 2020)*
• Graduate Enrollment	747 *(projected increase to 700 PhD and 500 MS by 2020)*
• Research Expenditures	$42 million *(projected to increase to $80-100M by 2020)*
• IDC generated	$4.1 million (Returned ~ $1.5M)
• Endowment Support	$36 million
• Endowed Professorships	11
• Philanthropic Gifts	$3.6 million received
• NAE Member	2
• Fellows of Professional Societies	88
• NSF Career Awards	50 (cumulative)
• Diversity	34 percent URM (2009 Claire Felbinger from ABET for outstanding service to URM)

Mission and Vision

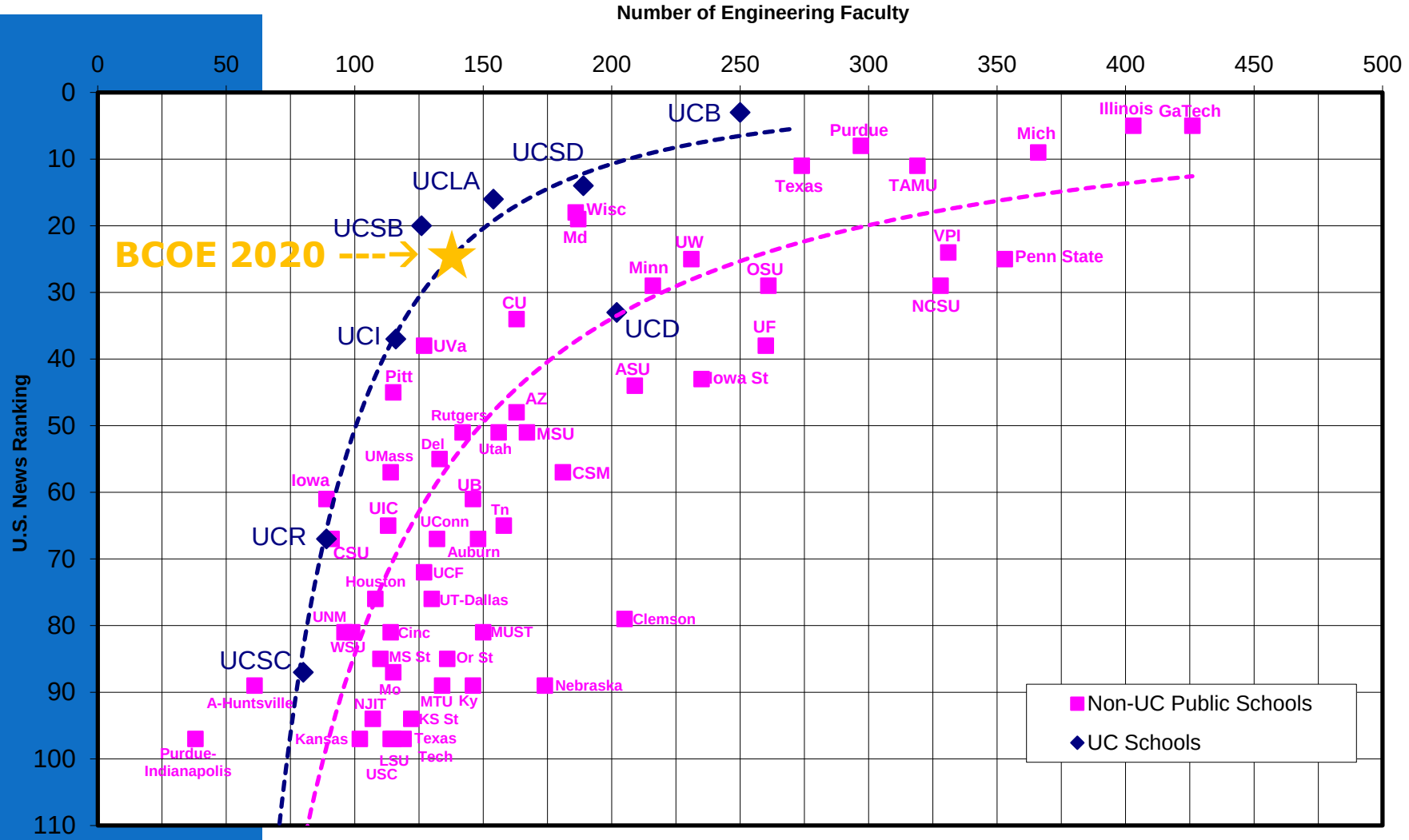
The Vision of the College of Engineering is to become a nationally recognized leader in engineering research and education

"Create a college with the profile of a top 25 Engineering School"

Our Mission is to:

- Produce engineers with the educational foundation and adaptive skills to serve rapidly evolving technology industries
- Conduct nationally recognized engineering research focused on providing a technical edge for the U.S.
- Contribute to knowledge of both fundamental and applied areas of engineering
- Provide diverse curricula that will instill in our students the imagination, talents, creativity and skills necessary for the varied and rapidly changing requirements of modern life
- Enable our graduates to serve in a wide variety of other fields that require leadership, teamwork, decision making and problem solving abilities
- Be a catalyst for industrial growth in the Inland Empire

Faculty Size vs 2014 U.S. News Ranking



Degrees

- BS: BIEN, CHE, CEN, CS, EE, ENVE, Bus Info, ME, and MSE (all accredited except for Bus Info)
- MS and PhD: BIEN, CEE, CEN, CS, EE, ME, MSE
- On-line MS: approved in 2012 with specializations in Bioengineering, Nanomaterials, Environmental Engineering Systems (Water), Mechanical Engineering and Electrical Engineering (Power Systems). For Fall 2016, Energy and Systems Engineering and Data Science .

ABET Accreditation

BIEN, CHE, CEN, CS, EE, ENVE, ME, MSE

Thanks to an army of participants, we earned outstanding reviews of our undergraduate programs and the maximum full accreditation until 2019.

Accredited ABET Engineering Accreditation Commission

Accredited ABET Computing Accreditation Commission

Materials Science and Engineering

- **Materials Research is one of the strength areas of research at UCR**; MSE provides a 'glue' for research in BCOE, CNAS and UCR
- MSE at UCR is an *interdisciplinary program with participating faculty* from Engineering (BCOE) and physical sciences (CNAS)

BCOE Core Faculty: 15

Participating faculty members**:**

28 from BCOE

13 from CNAS

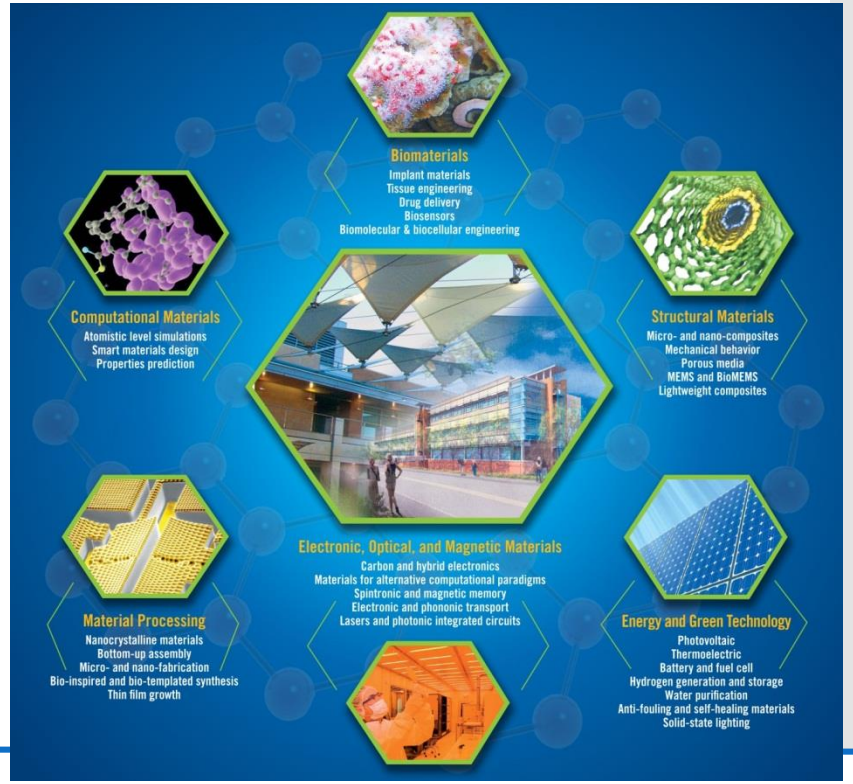
Award **B.S. , M.S.** and **PhD** degrees

Tremendous graduate student growth:

Have ~**45 grad students**

(*in just 3 incoming classes*)

New MSE building: A 'Nucleation Point' for MSE Teaching and Research



Master's On-Line

- A self-supporting program, which has been set up for highly qualified employed engineers who, for professional and personal reasons, are not able to attend traditional M.S. programs, yet are interested in obtaining the latest knowledge base of engineering and technology related to their area of work.
- Program discussions initiated in 2008, with a proposal submitted in 2009. Final approval by President Yudoff in 2012.
- We started the program with a specialization drawn from Bioengineering in 2013, and will expand to 10 specializations in five years.
- MSOL program is unique amongst the competing online programs since it offers an effective and well-balanced blend of professional core engineering management and specialization courses.

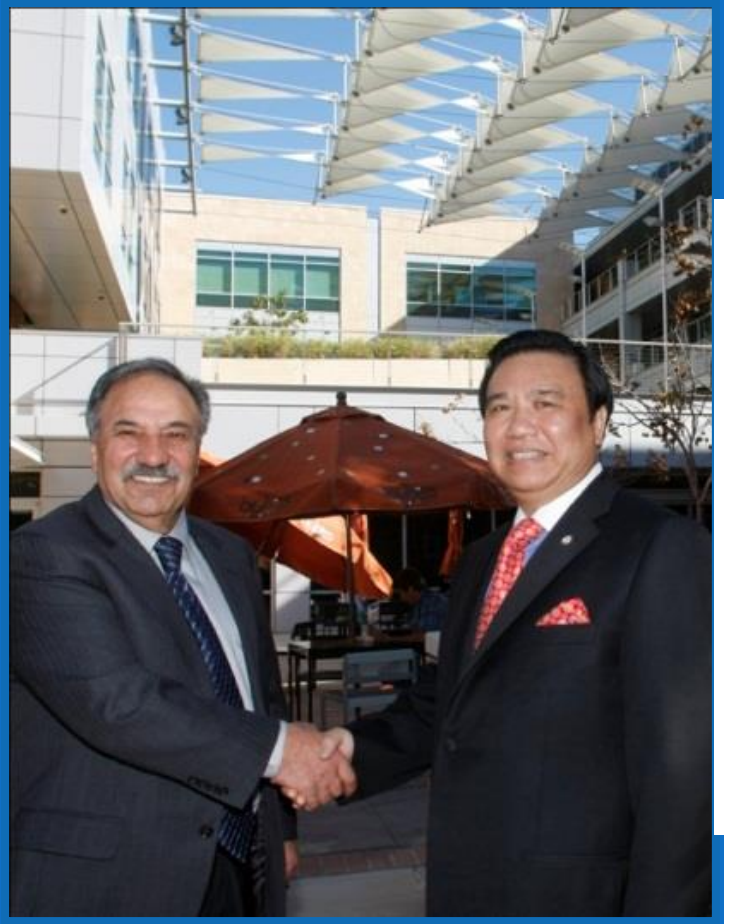
Research Centers

Collaborative centers and initiatives attract research funding, providing opportunities for students to prepare for careers of discovery and innovation:

- Center for Bioengineering Research
- Center for Environmental Research Technology (CE-CERT)
- Center for Nanoscale Science and Engineering (CNSE)
- Center for Research in Intelligent Systems (CRIS)
- Center for Ubiquitous Communication by Light (UC-Light)
- Southern California Research Initiative for Solar Energy (SC-RISE)
- Winston Chung Global Energy Center
- Phonon Optimized Engineered Materials (POEM)

Winston Chung Global Energy Center

The center will bridge the gap between industry and academia to address *energy generation, storage, and distribution* needs and issues.



Nosang Myung, Co-Director
Sadrul Ula, Co-Director

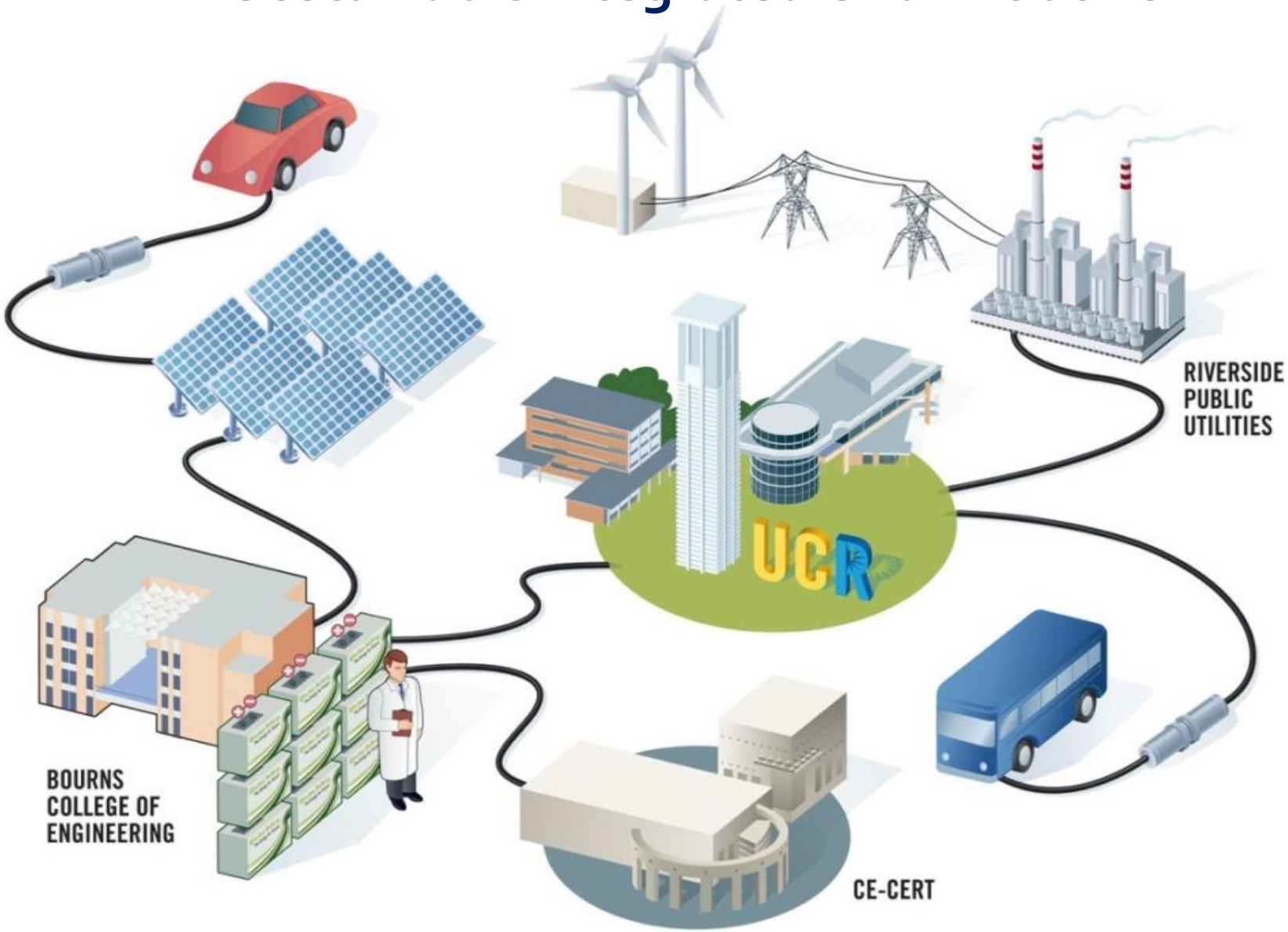
$10 million endowment established in 2011:

- Winston Chung Global Energy Center
- Winston Chung Endowed Professorship in Sustainability
- Winston Chung Endowed Professorship in Energy Innovation

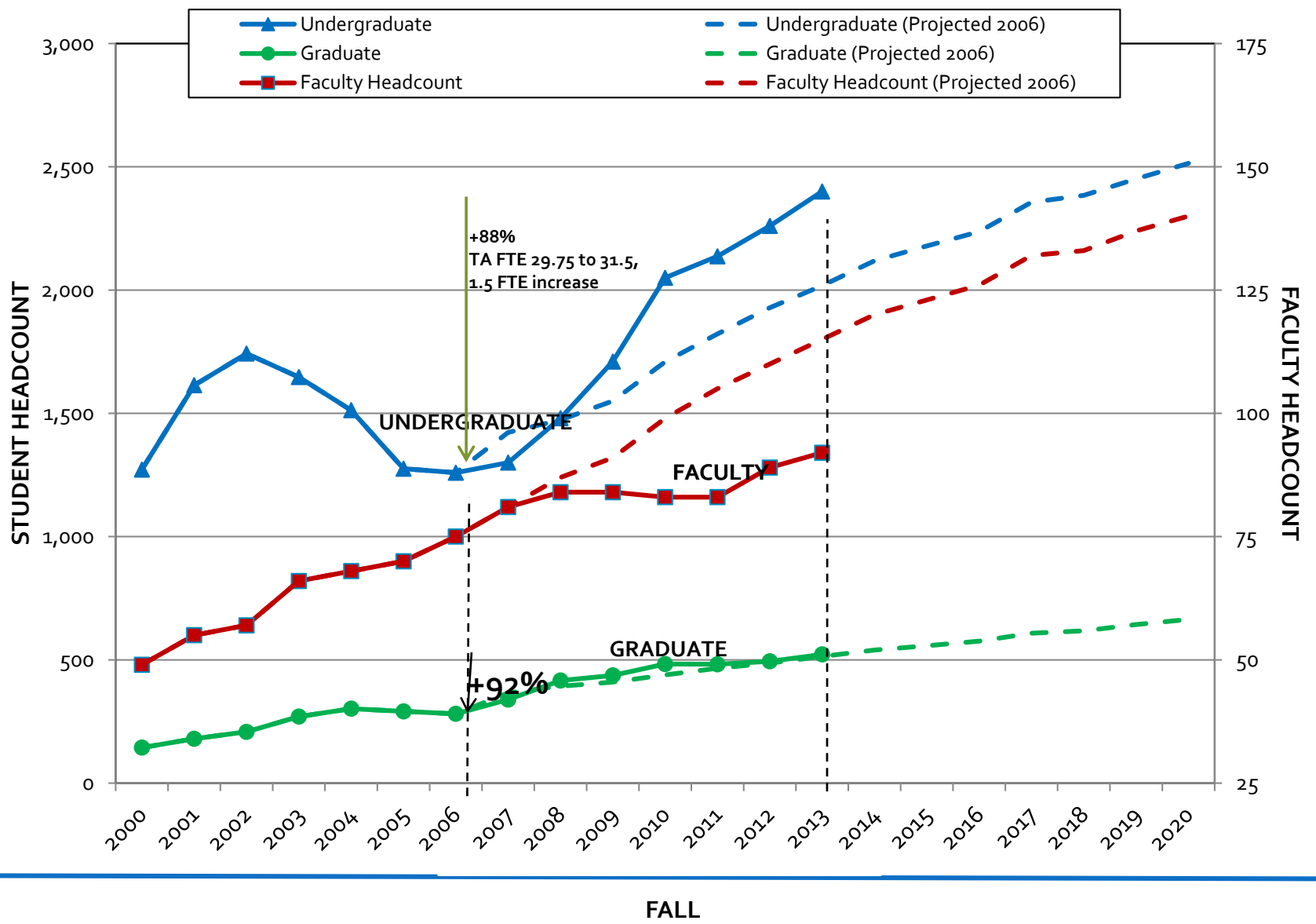
$6.2 million additional Funding:

- $2.5M rare earth lithium-ion Storage batteries to Winston Chung Hall
- $2.5M storage batteries to power CE-CERT AQMD
- $1,200,000 funding for energy related research year for two years

Sustainable Integrated Grid Initiative



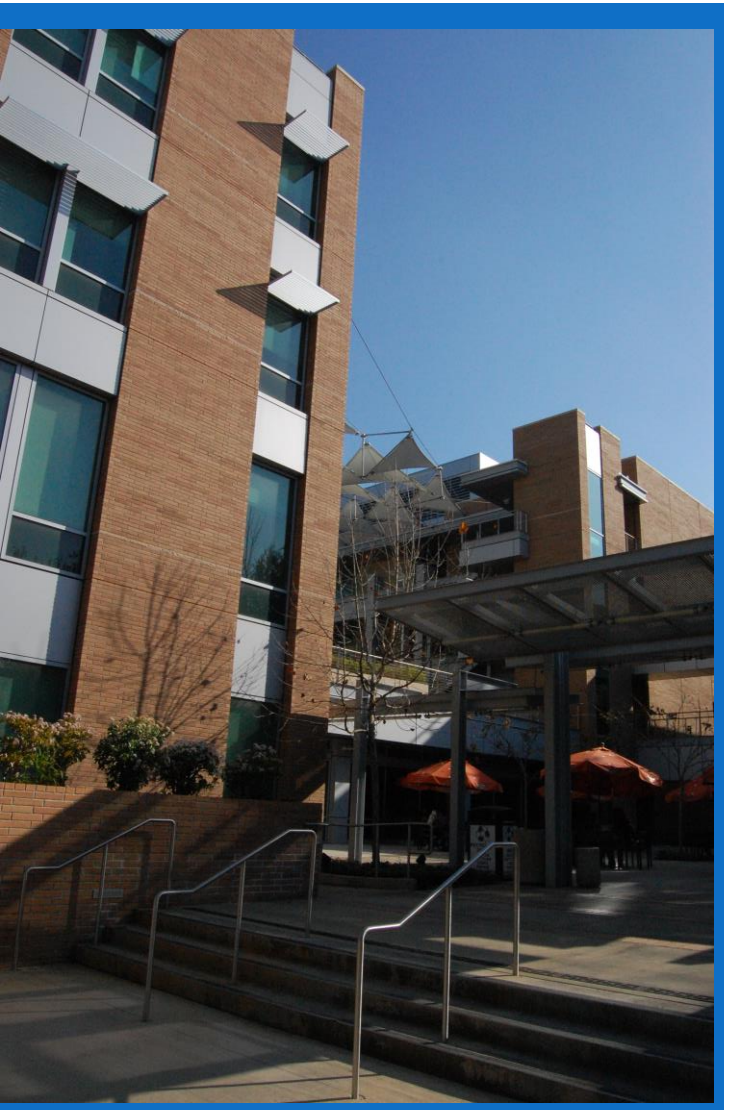
BCOE Planned (2006) Vs. Actual



Community Outreach

College deeply engaged with the local community, the region and world

- Bourns Engineering Day
- Wind Turbine Competition for region's community colleges
- MESA Robotics Competition
- Engineers Without Borders – Guatemala trips
- SPIRIT Program to engage local teachers in promoting math and science
- IEEE Boy Scout Merit Badge Day

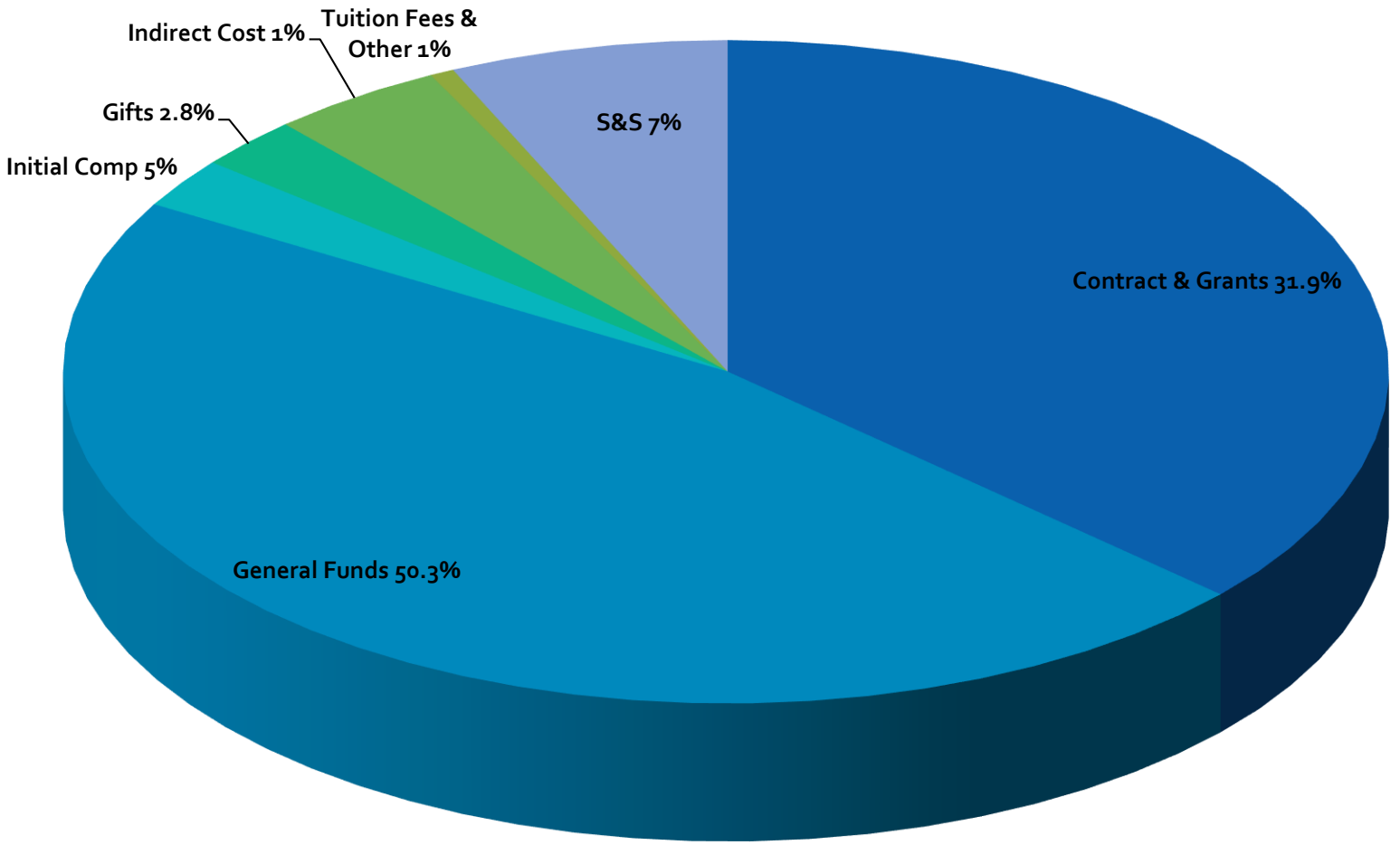


TOP 25 GRADUATE ENGINEERING PROGRAM COMPARISONS
2013 ASEE COLLEGE PROFILE DATA

UC Campus	2015 Rank	# of Fac	Degrees Awarded			Degrees Per Faculty			Enrollment			S/F Ratio		
			BS	MS	PHD	BS	MS	PHD	UG	MS	PHD	UG	MS	PHD
UC Berkeley	U3	247	1,079	436	243	4.4	1.8	1.0	4,019	399	1,537	16.3	1.6	6.2
UC San Diego	14	194	1,057	419	144	5.4	2.2	0.7	6,503	691	1,024	33.5	3.6	5.3
UC Los Angeles	16	155	682	545	160	4.4	3.5	1.0	3,158	914	940	20.4	5.9	6.1
UC Santa Barbara	19	124	290	124	101	2.3	1.0	0.8	1,347	178	587	10.9	1.4	4.7
UC Davis	31	198	600	218	132	3.0	1.1	0.7	3,503	383	747	17.7	1.9	3.8
UC Irvine	38	115	539	259	92	4.7	2.3	0.8	3,235	339	474	28.1	2.9	4.1
UC Riverside	**69**	**91**	**305**	**67**	**58**	**3.4**	**0.7**	**0.6**	**2,364**	**134**	**460**	**26.0**	**1.5**	**5.1**
UC Santa Cruz	81	78	321	44	31	4.1	0.6	0.4	1,788	78	302	22.9	1.0	3.9
Average		*150*	*609*	*264*	*120*	*4.0*	*1.6*	*0.8*	*3,240*	*390*	*759*	*22.0*	*2.5*	*4.9*

Top 25 Public (non-UC)	2015 Rank	# of Fac	Degrees Awarded			Degrees Per Faculty			Enrollment			S/F Ratio		
			BS	MS	PHD	BS	MS	PHD	UG	MS	PHD	UG	MS	PHD
Georgia Tech	6	436	1,823	1,051	313	4.2	2.4	0.7	9,278	1,766	2,138	21.3	4.1	4.9
Illinois	6	406	1,604	583	282	4.0	1.4	0.7	8,186	1,421	1,733	20.2	3.5	4.3
Michigan	8	381	1,299	1,115	245	3.4	2.9	0.6	5,923	1,642	1,538	15.5	4.3	4.0
Purdue	8	307	1,405	510	232	4.6	1.7	0.8	7,742	1,383	1,702	25.2	4.5	5.5
Texas	10	277	1,100	392	231	4.0	1.4	0.8	5,611	747	1,413	20.3	2.7	5.1
Texas A&M	11	328	1,394	566	285	4.3	1.7	0.9	8,390	1,544	1,522	25.6	4.7	4.6
Wisconsin	17	186	692	401	101	3.7	2.2	0.5	4,347	749	906	23.4	4.0	4.9
Virginia Tech	21	317	1,331	456	213	4.2	1.4	0.7	7,177	848	1,345	22.6	2.7	4.2
Maryland	22	208	832	521	130	4.0	2.5	0.6	3,834	1,040	882	18.4	5.0	4.2
Penn State	25	353	1,653	386	183	4.7	1.1	0.5	10,021	556	1,163	28.4	1.6	3.3
Average		*320*	*1,313*	*598*	*222*	*4.1*	*1.9*	*0.7*	*7,051*	*1,170*	*1,434*	*22.1*	*3.7*	*4.5*
Average (including UC)		*280*	*1,160*	*536*	*205*	*4.1*	*1.9*	*0.7*	*6,110*	*991*	*1,316*	*21.6*	*3.5*	*4.8*

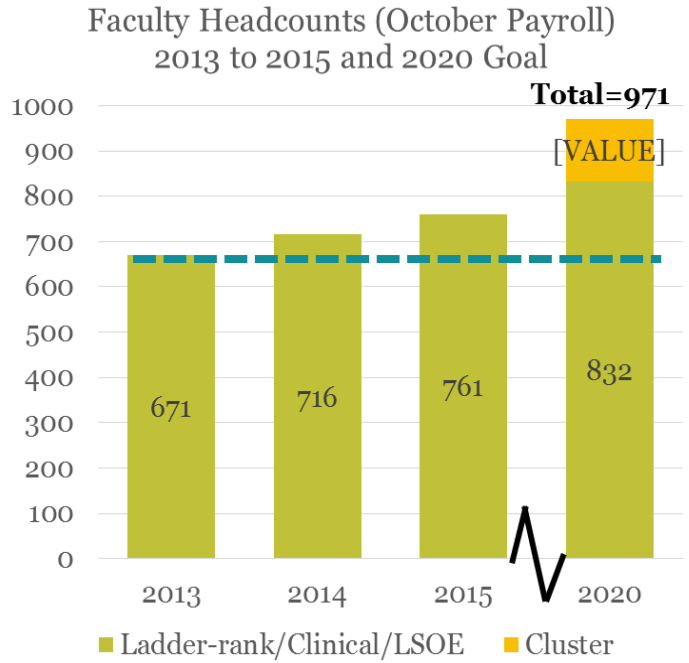
Summary Expenditures by Source (FY 2013-14) Total $51.8M



Total IDC Generated: $4.8M

Academic Recruitment/ Cluster Hires

The University of California at Riverside is embarking on a major new hiring initiative that will add 300 tenure-track positions over the next three years. This significant expansion of our faculty, along with strategic investments in research infrastructure, will focus on 33 interdisciplinary areas that were selected through a peer-reviewed competition. This initiative will achieve critical mass in vital and emerging fields of scholarship, foster truly cross-disciplinary work, and further diversify the faculty at one of America's most diverse research universities.

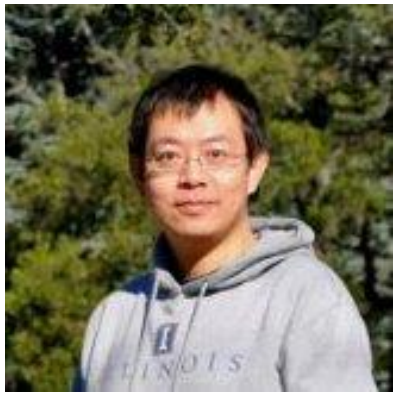


***118** Open Recruitments in FY 2015-16*

What does this mean for BCOE? Additional 22-25 faculty by Fall 2016

The new faces to expect Fall 2016

XIAOPING HU
BIEN



JINYONG LIU
CEE

MOHSEN LESANI
CSE

CRAIG SCHROEDER
CSE

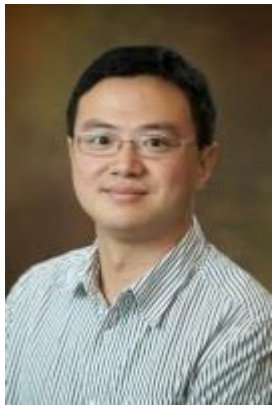
SHANE CYBART
ME

HYOSEUNG KIM
ECE

SALMAN ASIF
ECE

KONSTANTINOS
KARYDIS
ECE

SINISA COH
ME/MSE



HENG YIN
CSE

The new faces to expect Fall 2016

CHENGYU SONG
CSE

AHMED ELDAWY
CSE

EVANGELOS PAPALEXAKIS
CSE

MANISH SAGGAR
BIEN

CHEN LI
ME/MSE

HONGDIAN YANG
BIEN

AXEL HOFFMAN
ECE

YANRAN LI
CEE

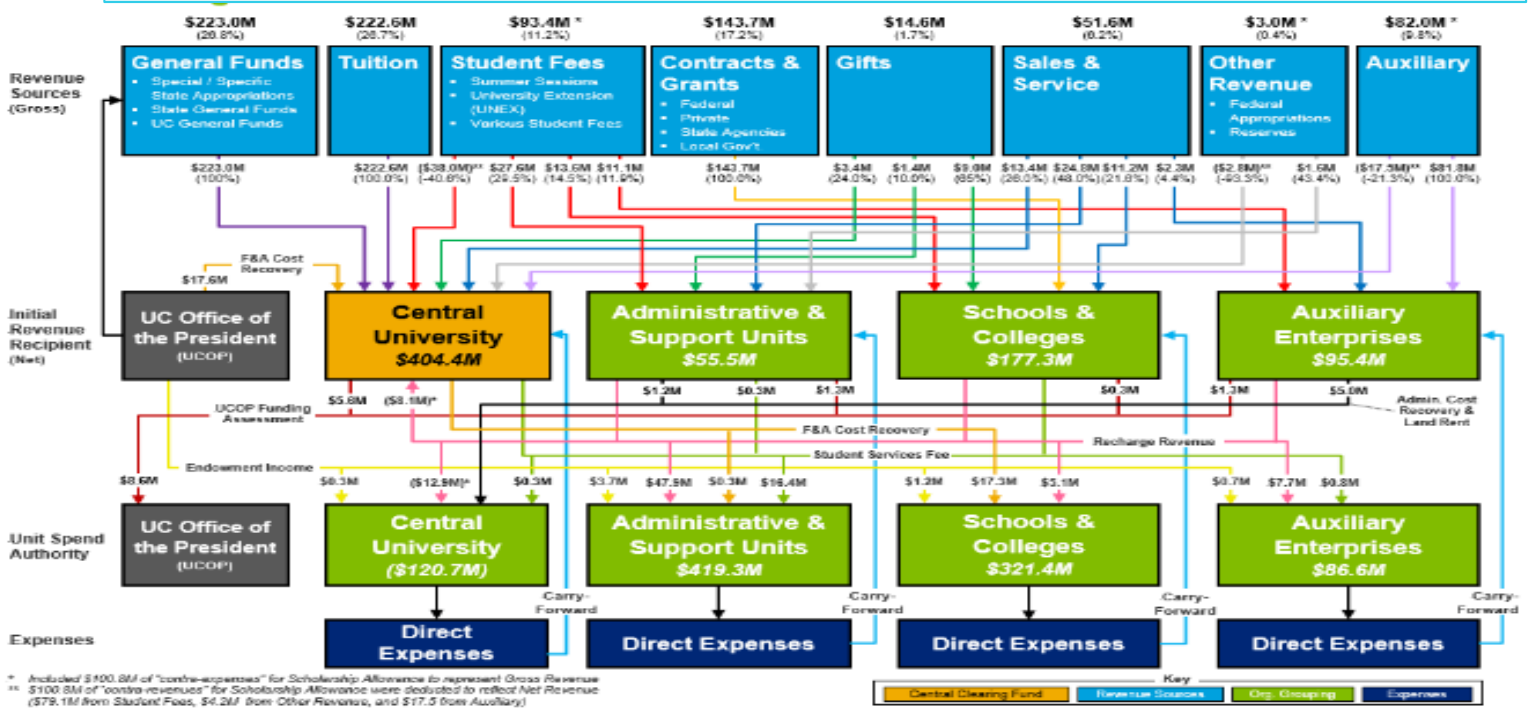
And still more coming!

BUDGET MODEL PRINCIPLES

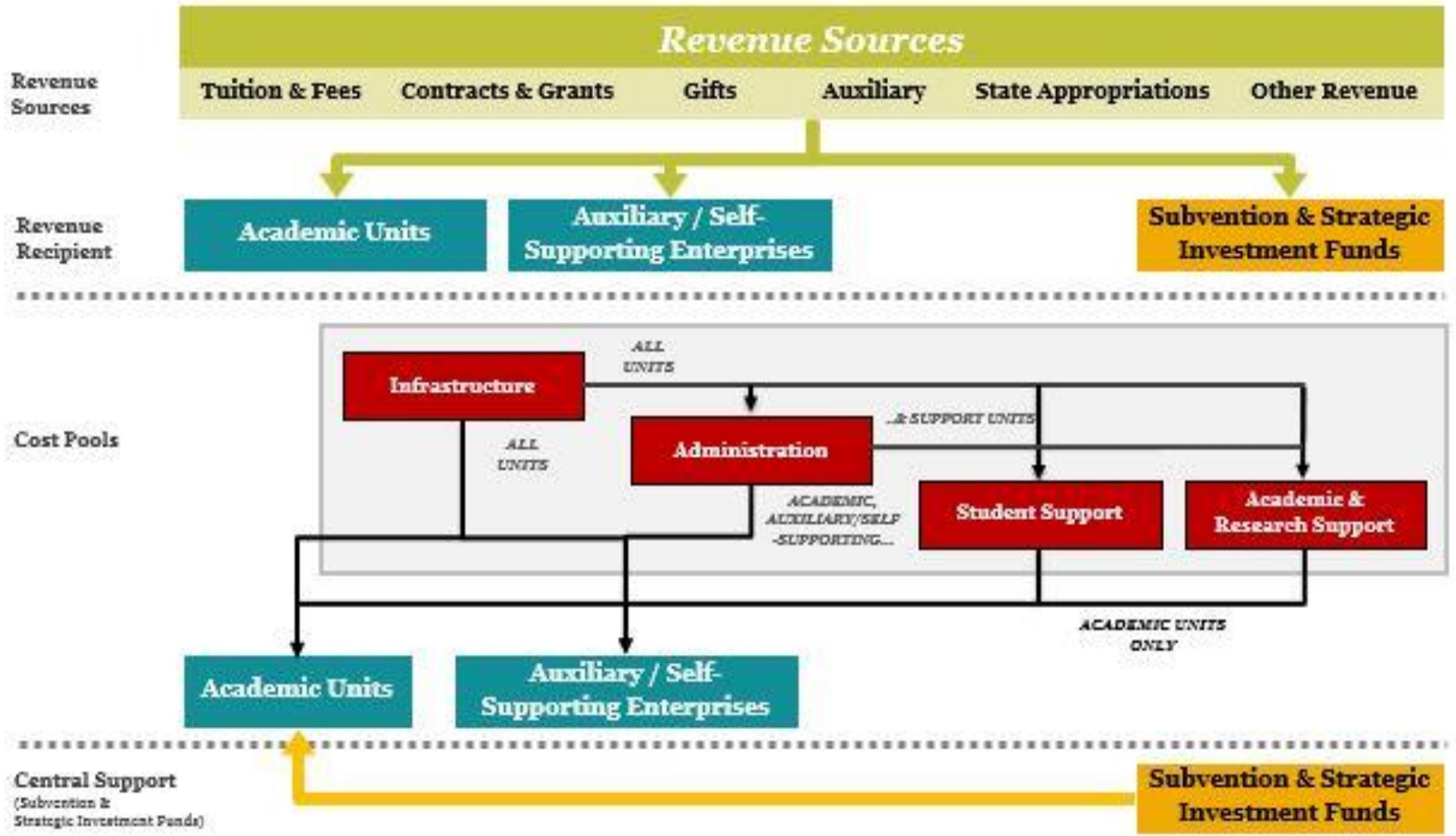
New budget model encourages financial sustainability

1. **Transparent** — Enable campus to understand flows of revenue and use of resources
2. **Incentivized** — Distribute tuition based on performance (student credit hours, majors, & graduation rate improvements)
3. **Risk Tolerant** — Reward entrepreneurial behavior by department/unit (e.g., increasing grant funding)

CURRENT FUNDS FLOW

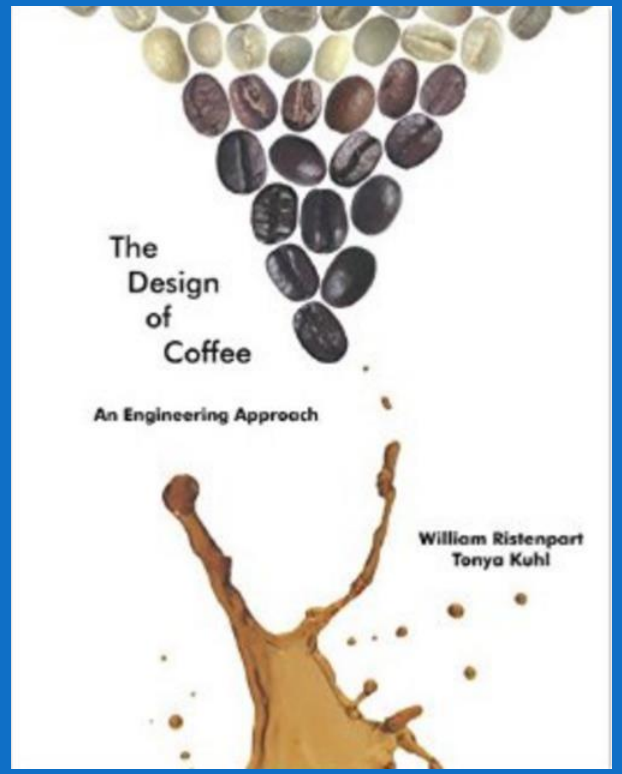


New budget model encourages financial sustainability



This could be the start of a new course sequence!

Proposal for a new course…



- ENGR 101 – Engineering of Coffee

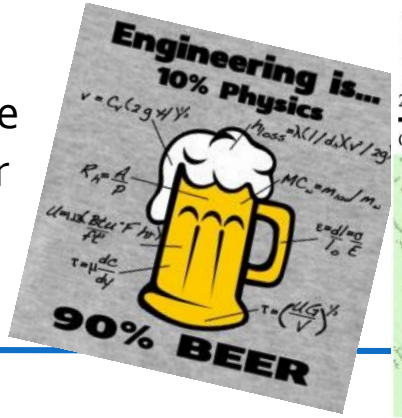
The Design of Coffee provides a non-mathematical introduction to chemical engineering, as illustrated by the roasting and brewing of coffee. Hands-on coffee experiments demonstrate key engineering principles, including material balances, chemical kinetics, mass transfer, fluid mechanics, conservation of energy, and colloidal phenomena. The experiments lead to an engineering design competition where contestants strive to make the **best tasting coffee** using the **least amount of energy** – a classic engineering optimization problem, but one that is both fun and tasty!

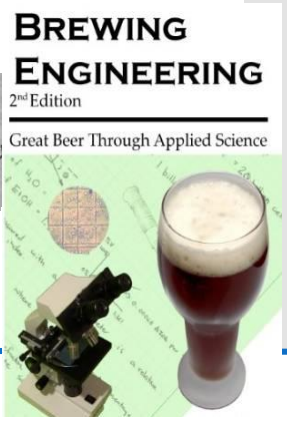
Anybody with access to a sink, electricity, and inexpensive coffee roasting and brewing equipment can do these experiments, either as part of a class or with your friends at home. *The Design of Coffee* will help you understand how to think like an engineer – and how to make excellent coffee!

FEATURES:
* Covers all aspects of making coffee, from green beans to the final brew
* Does not require calculus or college-level chemistry
* Emphasizes the scientific method and introductory data analysis with guided data sheets and lab report questions
* Includes 9 full experiments, each with background on key concepts, overview of necessary equipment, and detailed instructions:

Lab 1 - Reverse Engineering a Drip Coffee Brewer
•Lab 2 - Process Flow Diagram and Mass Balances for Coffee
•Lab 3 - The pH of Coffee and Chemical Reactions
•Lab 4 - Measuring the Energy Used to Make Coffee
•Lab 5 - Mass Transfer and Flux during Brewing
•Lab 6 - Coffee as a Colloidal Fluid and the Effect of Filtration
•Lab 7 - First Design Trials: Optimizing Strength & Extraction
•Lab 8 - Second Design Trials: Scaling Up to 1 Liter of Coffee
•Lab 9 - Design Competition and Blind Taste Panel

- ENGR 102 – Engineering of Wine
- ENGR 103 – Engineering of Beer





Thank you

- **Next to present will be:**

Sharon Walker, Associate Dean for Academic Student Affairs

Chinya Ravishankar, Associate Dean for Graduate Education & Research

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