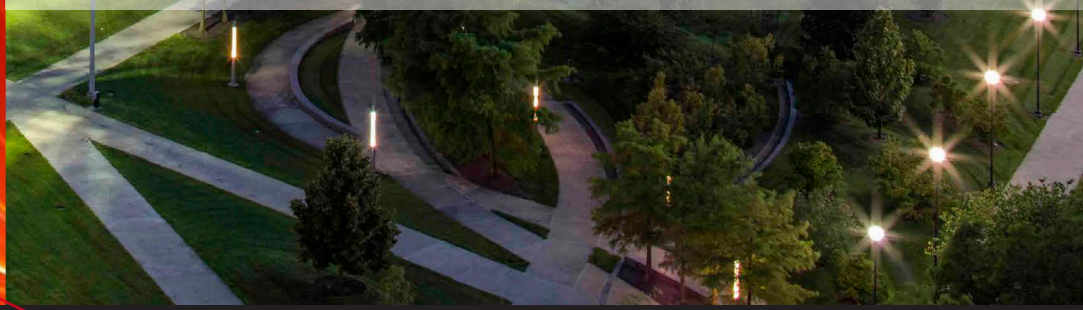
ENGINEERING & APPLIED SCIENCE

UNIVERSITY OF Cincinnati



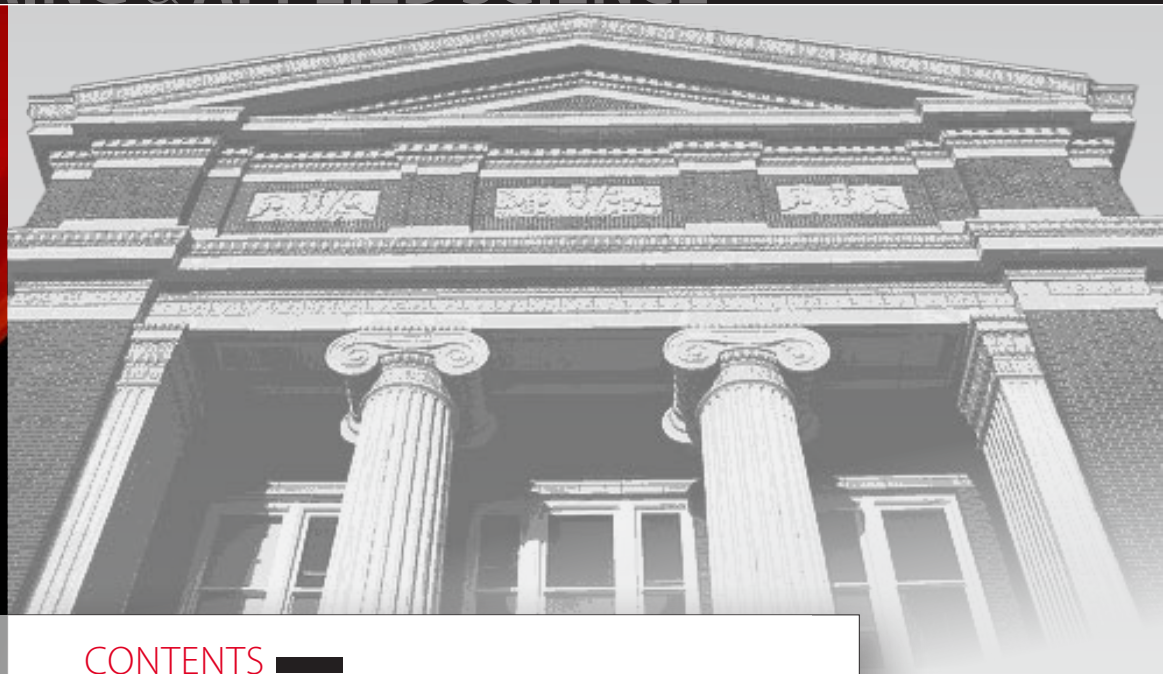
2015

ANNUAL REPORT

WE ENGINEER BETTER™

ENGINEERING & APPLIED SCIENCE

UNIVERSITY OF Cincinnati



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Design & Layout
Patricia Lloyd

Copy Editors
Tom Curtis
Ashley Duvelius
Patricia Lloyd

Contributors
Natalie Bullock
Shannon Frohme

Photography
Cover photos: Ofer Wolberger/BRANSCH INC.
Katie Hageman
UC Photographic Services

COLLEGE ADMINISTRATION

Teik C. Lim, Dean
Frank M. Gerner, Senior Associate Dean
A. Allen Arthur, Associate Dean
Mark T. Bowers, Assistant Dean
Joseph H. Nevin, Assistant Dean

COLLEGE ADVISORY COUNCIL

MESSAGE FROM **THE DEAN**

I am pleased to report another year of sustained growth and achievement for the College of Engineering and Applied Science. We have once again experienced a record-breaking enrollment of nearly 5,300 while further advancing the quality of our students as we welcomed an exceptional incoming class, complete with 24 National Merit Scholars and one prestigious Presidential Scholarship recipient. We have been proudly producing outstanding graduates through our co-op program for more than 100 years and today, our stellar students account for more than 32% of the University-wide Honors Program.

As a part of our commitment to maintaining academic excellence, we have sought after and hired more than 30 faculty members from around world who are outstanding researchers and educators. These impressive individuals only add to our existing renowned roster, bringing more expertise, opportunities and resources to our highly-regarded, experiential learning-infused curriculum. By investing in faculty who are the best and brightest, we are significantly enhancing our students' learning experience, bolstering our research capacity and substantially improving our national and global reputation.

The college continues to strive for greater diversity in the field of engineering as we proudly partner with our University and community colleagues both inside and outside of the classroom. Many of our students, faculty and staff are also becoming increasingly involved with the all-university Diversity & Inclusion efforts to enhance the recruitment, retention and graduation of underrepresented minority students. On this note, I'm pleased to report that our minority confirms for Fall 2016 are up more than 60%.

Our efforts continue to reach beyond campus borders, both domestically and internationally, as we collaborate with industry, community and global partners alike. The college's dual enrollment program now includes more than 25 area high schools and 500+ students taking our freshman engineering classes at their schools. Additionally, my colleagues and I have been traveling to, and receiving visitors from, strategic partners in South America, Africa, the Middle East, Europe and Asia who will leverage our educational and experiential learning opportunities, better preparing our students for the global workforce.

On behalf of the students, faculty and staff of CEAS, I thank you for your generous support and participation in our mission to produce the next generation of engineering leaders.

Teik C. Lim, PhD, Dean
Herman Schneider Professor

Teik C. Lim

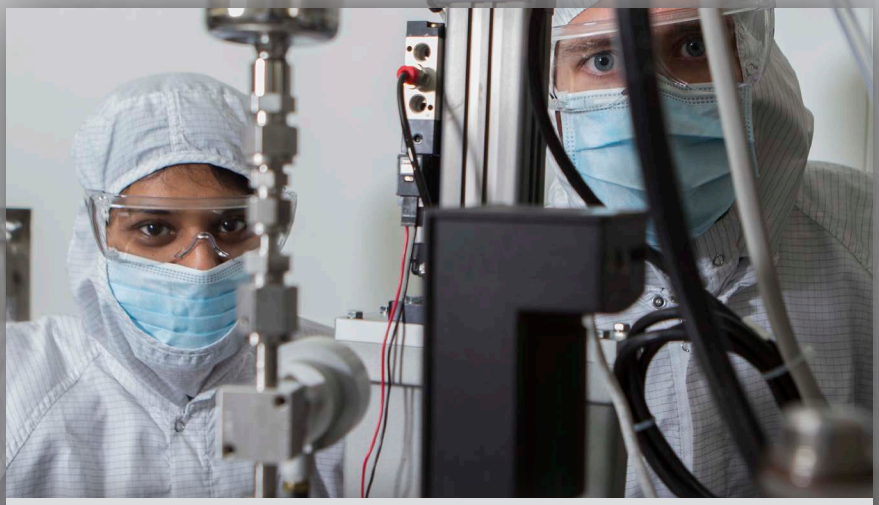
WE ENGINEER BETTER™

STUDENT ENROLLMENT BY MAJOR | FALL 2015

Undergraduate Programs	
Aerospace Engineering	302
Architectural Engineering	127
Biomedical Engineering	313
Chemical Engineering	526
Civil Engineering	316
Computer Engineering	266
Computer Engineering Technology*	3
Computer Science	313
Construction Management	198
Electrical Engineering	338
Electrical Engineering Technology	87
Environmental Engineering	84
Fire & Safety Engineering Technology	47
Mechanical Engineering	600
Mechanical Engineering Technology	273

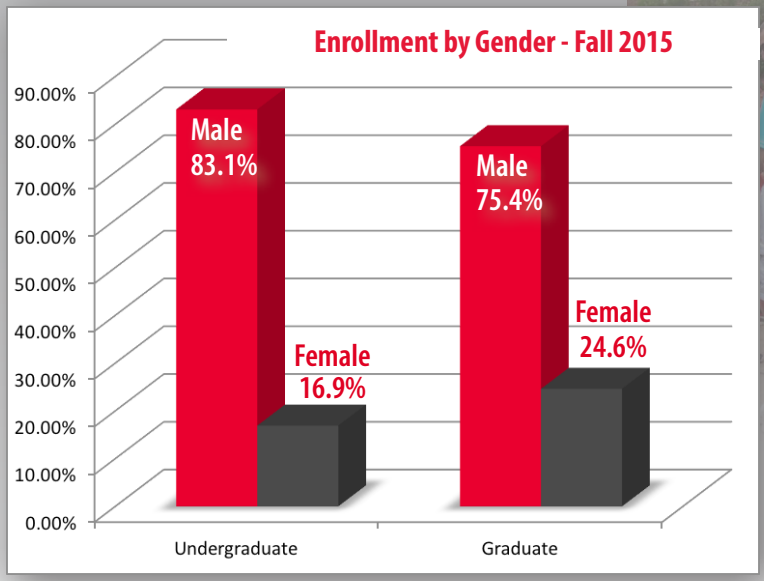
** no new admits*

Freshman Engineering Program (undeclared major)	*123*
EASE Program (preparatory)	*93*
Joint Co-op Institute (Chonqing University)	
Electrical Engineering	*154*
Mechanical Engineering	*87*
Total	**4,250**

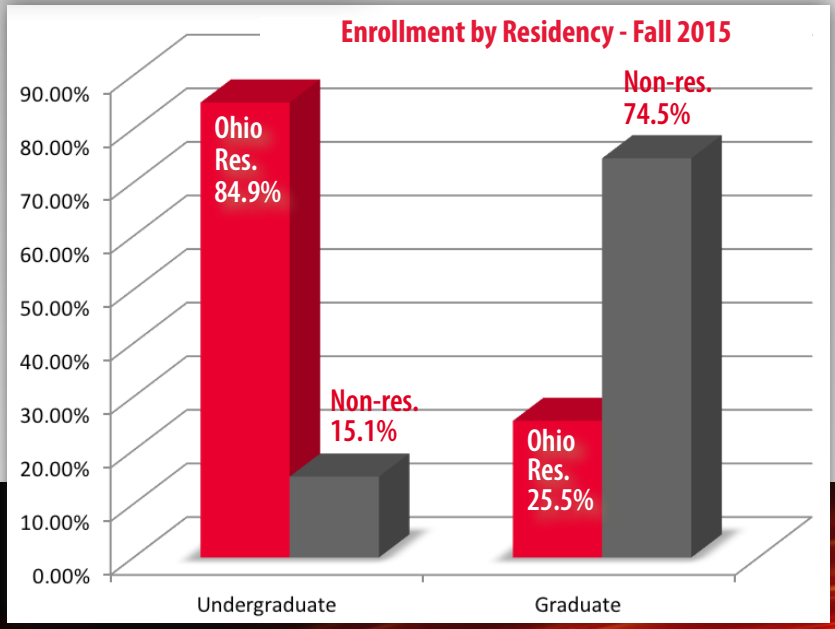


Graduate Programs *(Fall 2015)*

	MS	MEng	PhD	
Aerospace Engineering and Mechanics	78	29	48	
Biomedical Engineering	7	9	13	
Chemical Engineering	17	6	20	
Civil Engineering	36	9	14	
Computer Engineering	33	33	-	
Computer Science	67	106	-	
Computer Science Engineering	-	-	58	
Electrical Engineering	45	68	36	
Environmental Engineering and Science	33	4	34	
Materials Science and Engineering	35	7	41	
Mechanical Engineering	120	131	67	
Sub totals	**471**	**402**	**331**	
TOTAL				**1,204**

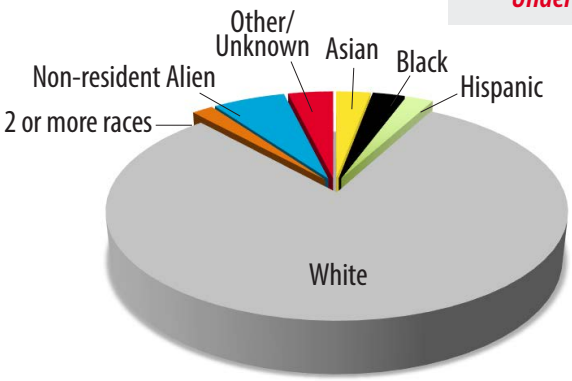


STUDENT ENROLLMENT

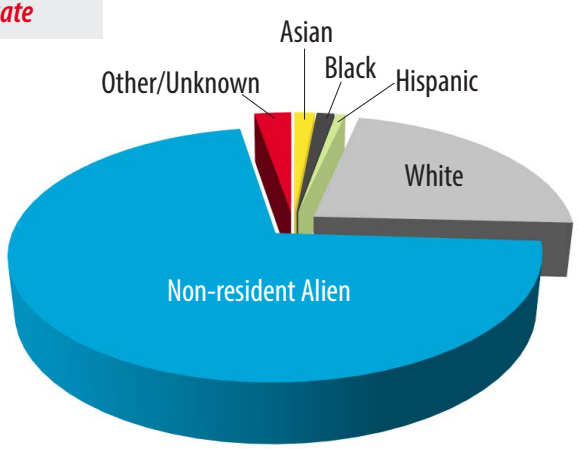


TOTAL Enrollment By Ethnicity - Fall 2015

Undergraduate



Graduate



Enrollment of U.S. Residents by Ethnicity - Fall 2015

	Undergraduate %	*Graduate %*
Asian	3.2	5.8
Black	3.0	5.0
Hispanic	2.6	2.7
White	89.2	85.8
Two or more races	2.0	.7
Total	**100%**	**100%**

ENGINEERS OF THE MONTH

Over the course of the academic year CEAS recognizes 12 of its highest achieving junior and senior undergraduate students as an **Engineer of the Month.** These students displayed leadership in the classroom, on the job, in professional organizations, around campus and in the community.

AUGUST. **Daniel Strohminger,** chemical engineering senior. Daniel's research lies heavily in the field of chemical manufacturing. He has spent four co-op placements at BASF Corporation's Cincinnati location and hopes to continue to work in the agro-chemical industry after graduation. Daniel is a member of the engineering honor society Tau Beta Pi.

SEPTEMBER. **Chelsea Duran,** electrical engineering junior in the ACCEND™ program. During her co-op rotations at GE Aviation, Chelsea successfully led several team projects, including thermal management research and hardware troubleshooting. Chelsea maintained an impressive 4.0 GPA in the accelerated engineering program.

OCTOBER. **Andrew Nottingham,** mechanical engineering senior. Andrew co-oped at GE Aviation. He plans to apply for the CEAS aerospace engineering graduate program to further enhance his bright future in the field of aviation mechanical engineering. He is co-chair of the Engineers Without Borders Education Committee.

NOVEMBER. **Linette Green,** architectural engineering senior. Linette has completed five co-op rotations at THP Ltd, a structural engineering consulting firm specializing in large-scale complex structures. Linette is a founding member of the architectural engineering honor society, Phi Alpha Epsilon, and plans to pursue a master's degree in architecture.

DECEMBER. **Nicklas Stockton,** aerospace engineering junior in the ACCEND™ program. Nicklas received a National Science Foundation (NSF) sponsorship for his participation in the Academic-Year Research Experience for Undergraduates (AY-REU) program — an impressive accomplishment for a junior student. After obtaining his BS and MS, Nicklas plans to continue his research and work with unmanned aerial vehicle (UAV) systems.

Continued on page 10

CO-OP ENROLLMENT

Students enrolled for Professional Practice (co-op) sections – Autumn 2015

Undergraduate Programs	
Aerospace Engineering	80
Architectural Engineering	22
Biomedical Engineering	72
Chemical Engineering	128
Civil Engineering	83
Computer Engineering	71
Computer Science	72
Construction Management	55
Electrical Engineering	92
Electrical Engineering Technology	6
Environmental Engineering	10
Mechanical Engineering	178
Mechanical Engineering Technology	62
Total	**931**

we Experience

$32 million — *combined earnings by CEAS co-op students for academic year 2015*

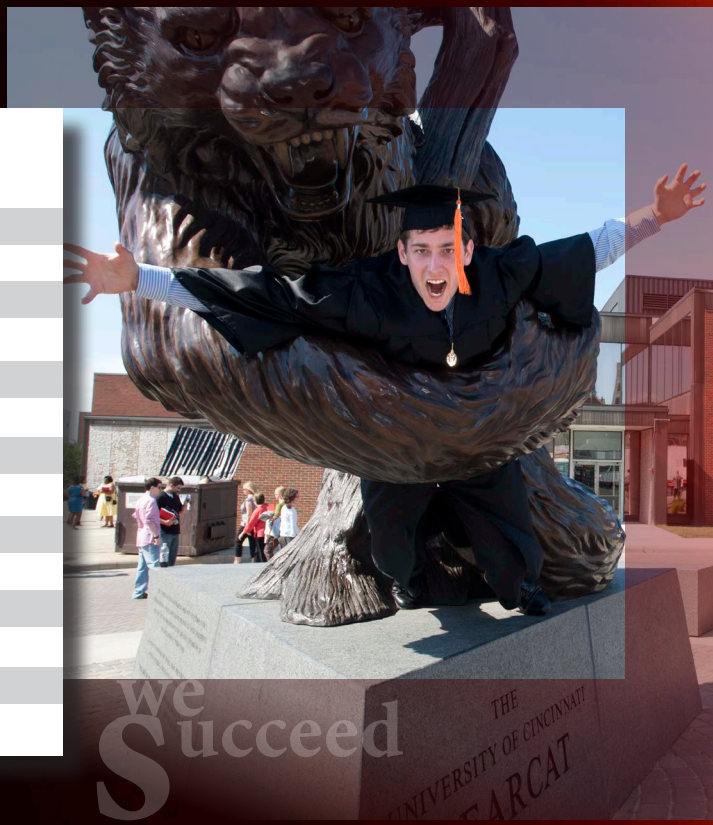
Undergraduate Degrees Awarded *(2014– 2015)*

Aerospace Engineering	54	Construction Management	41
Architectural Engineering Technology	13	Electrical Engineering	45
Biomedical Engineering	52	Electrical Engineering Technology	20
Chemical Engineering	94	Fire & Safety Engineering Technology	15
Civil Engineering	59	Materials Science and Engineering	2
Computer Engineering	16	Mechanical Engineering	88
Computer Engineering Technology	6	Mechanical Engineering Technology	43
Computer Science	19		
		Total	**567**

DEGREES **AWARDED**

Graduate Degrees Awarded *(2014 – 2015)*

	MS	MEng	PhD
Aerospace Engineering and Mechanics	27	3	8
Biomedical Engineering	4	7	6
Chemical Engineering	5	5	5
Civil Engineering	7	3	1
Computer Engineering	19	6	-
Computer Science	26	22	-
Computer Science & Engineering	-	-	3
Electrical Engineering	14	15	12
Environmental Engineering and Science	14	6	9
Materials Science and Engineering	3	4	2
Mechanical Engineering	67	34	9
Sub totals	**186**	**105**	**55**
TOTAL			**346**



ENGINEERS OF THE MONTH

(continued from page 8)

JANUARY. **Madeline Adams,** senior mechanical engineering student. While co-oping at Toyota USA, Madeline gained real-world experience in vehicle planning and production engineering. She is the CEAS Tribunal senator and a student ambassador.

FEBRUARY. **Michael Arnold,** senior, biomedical engineering. Michael maintains a GPA of 3.9 as an honors BME student. He has completed co-ops at Cincinnati Children's Hospital Medical Center and Assurex Health. During the fall of 2016, Michael will join the incoming class of medical students at UC's College of Medicine.

MARCH. **Andrew Griggs,** mechanical engineering senior. Andrew maintains a 4.0 GPA while also minoring in business administration and serving as UC's student body vice-president. He completed four co-op rotations at GE Aviation where he will begin the Operations Management Leadership program November of 2016.

APRIL. **Ashley Mattson,** junior, electrical engineering. She is a Cincinnatus Scholarship recipient with a 3.8 GPA and completed co-ops at Diebold, Inc. Ashley was selected to participate in the CEAS Women in Science and Engineering (WISE) Research Experience for Women Undergraduates (REWU) program in 2013.

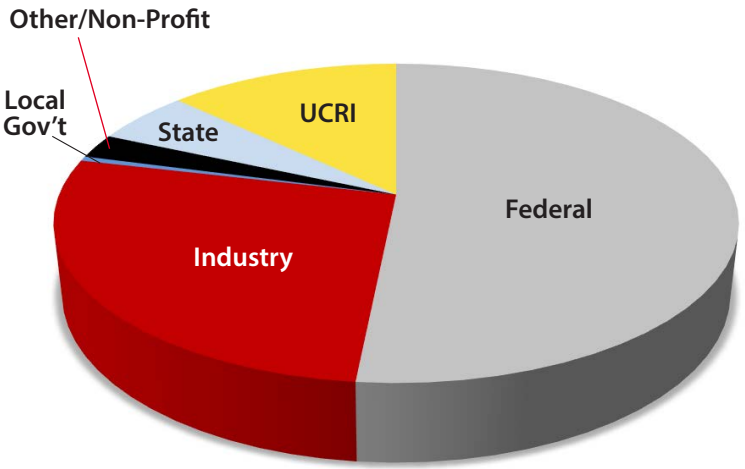
MAY. **Chris Douglas,** civil engineering junior. Chris is a Cincinnatus scholar with a 3.8 GPA. He is the treasurer of UC's chapter for the American Society of Civil Engineers (ASCE). Chris completed his co-op rotations at IBI Group and Choice One Engineering.

JUNE. **Ryan Hoying,** junior, construction management. Ryan manintains a 3.9 GPA and is an active member of Sigma Lambda Chi honor society. He is also the recipient of several departmental scholarships. He completed project engineering and estimating co-op assignments with Shook Construction.

JULY. **Mitch Hudepohl,** junior, construction management. Mitch has completed two co-op rotations at ARCO National Construction and also at Balfour Beatty Construction in West Palm Beach, Florida. Mitch is a business administration minor and the president of UC's Construction Students Association (CSA). He holds a strong passion for volunteering with Habitat for Humanity.

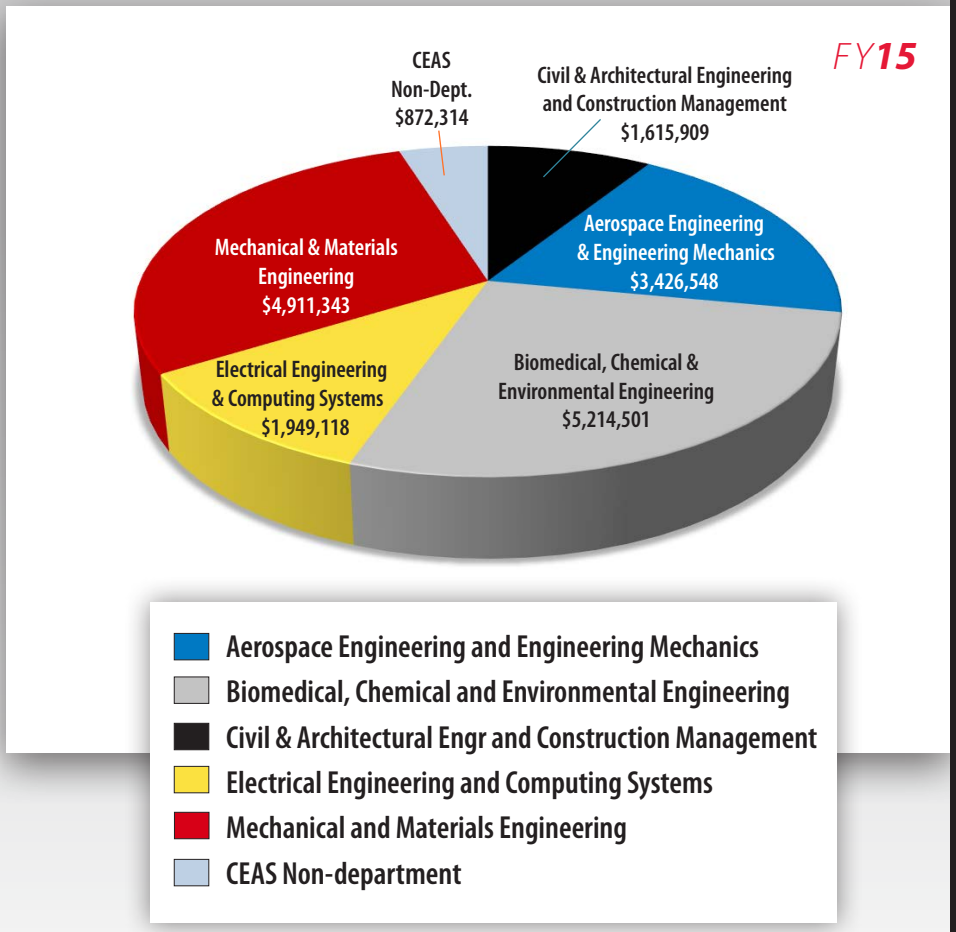
GRANTS & CONTRACT AWARDS BY SOURCE

*FY**15***



FY15	
Federal	$10,662,216
Industry	5,603,317
Local Government	96,217
Other, Non Profit	512,873
State of Ohio	1,115,110
UCRI	2,682,878
TOTAL	**$20,672,611**

GRANTS & CONTRACT AWARDS BY DEPARTMENT



Engineering a Better way

Yoonjee Park, PhD, is working to develop effective micro drug delivery systems to access precise locations in the body to treat medical conditions. Park was first inspired to pursue this course of study when she saw how the drugs used to kill cancer cells also killed cells in other parts of the body.

She hopes to find a way of sending drugs only to the specific area of the body that needs treatment rather than inadvertently treating (and harming) the whole body.

Park has also been working with Professor **James Lin**, PhD, Director of the Skeletal Tissue Evaluation and Engineering Laboratory, to specifically focus on the regeneration of spinal discs. Using vehicles made with perfluoro-carbons, they have created bio-safe, durable, reliable vehicles that can be inserted into the discs and traced via medical imaging.

EnableUC is a newly established CEAS biomedical engineering (BME) student organization collaborating with e-NABLE — a global network of volunteers and an open source organization that provides a variety of cost-effective prosthetic hand designs.

The open source format of e-NABLE allows anyone with access to a 3D printer to design and produce their own prosthetic hand. e-NABLE originated at Rochester Institute of Technology in 2013 and has engineered and delivered over 1,500 3D printed hands to children.

Jacob Knorr, CEAS biomedical engineering student, and president and founder of EnableUC, found inspiration in the endless possibilities of engineering and 3D printing to help children in need in the Greater Cincinnati region.

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ENGINEERING & APPLIED SCIENCE

Global Connections

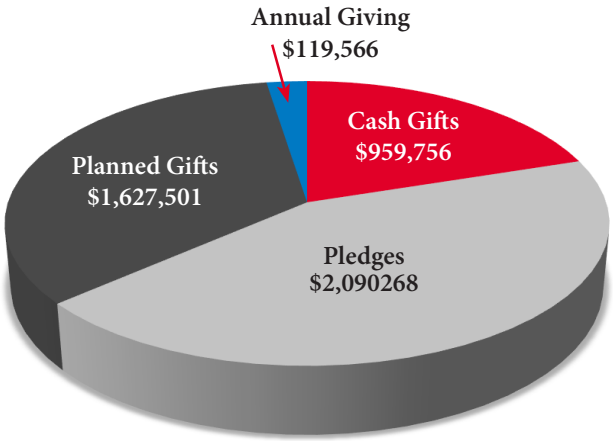
Economic globalization, modern communication technology and growing mobility are creating an increasingly interconnected world. The importance of global engagement has become a key component of the University of Cincinnati's Third Century vision as well as one of the College's top priorities.

Ranked among the top universities in France, the **University of Bordeaux (UBx)**, is our most recent strategic partner. Soon to be established is the UC-UBx **Collaborative Degree Program** for the Aerospace Engineering Track: Aero-Systems Operations **(AESOP)**.

Joining UBx expertise in maintenance with UC expertise in engineering, the one-year graduate level program will offer a practice-oriented, individualized degree that prepares engineers to excel in this new working world. Students at each university may simultaneously pursue both UC's Master of Engineering degree and UBx's International Diploma.

COLLEGE **DEVELOPMENT**

Private Support | FY15
Total $4,797,091



Gifts of $10,000 or more in FY15

Gift Range	Number of Gifts
$10,000-24,999	16
$25,000-49,999	11
$50,000-99,999	11
$100,000-499,999	4
$500,000 or more	2

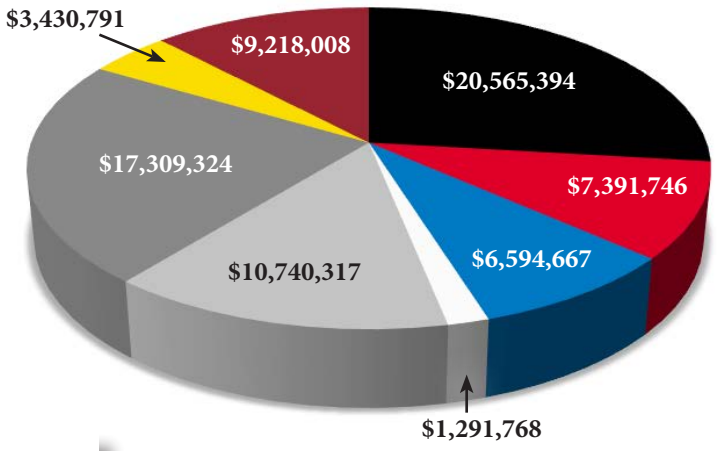
*For information on how you can become involved or make a gift, please go to **GIVE to CEAS** or contact the CEAS Development Office at 513-556-6279.*

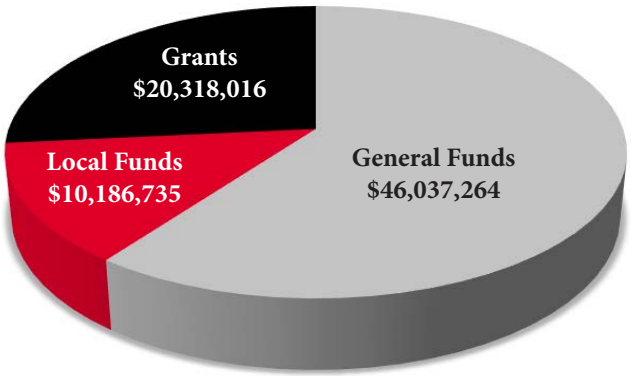
The University of Cincinnati Foundation

COLLEGE **BUDGET**

Annual Expenditures | FY15
Total $76,542,015

- Faculty Salaries
- Staff Salaries
- Graduate Assistants
- Student Workers
- Fringe Benefits
- Operating *(includes equipment)*
- Undergraduate/General Scholarships
- Graduate Scholarships





- ***General Funds:*** *include salaries, benefits, graduate assistantships, operating, scholarships*
- ***Local Funds:*** *includes designated, gift/endowment, other non-grant*
- ***Grants:*** *does not include indirect expense*

Faculty & Staff *Fall 2015*

Faculty	
Tenure Track	131
Non-Tenure Track *(Educators, Practice, Research, Visiting)*	26
Administration & Staff	
Dean, Associate/Assistant Deans	5
Staff* *(including research funded)*	111
Postdoctoral Fellows	16

* *Excludes adjuncts, visiting scholars, emeriti, temporary employees, students and volunteers.*

Engineering a Better way

Continued from page 11

While children are not typically candidates for prosthetic limbs since they will grow out of the expensive design, 3D printing can produce the hands for as little as $15. The 3D-printed hands produced by EnableUC allow a child to grasp an object by simply flexing the joint closest to their residual limb. Knorr explains, "For partial hand patients, the device is designed to move the fingers as the child flexes their wrist. For children who do not possess a wrist joint, elbow flexion is required to close the prosthetic fingers and grasp objects."

Hyperloop — the solar-powered high-speed future of inter-city transportation. The idea of a superfast mode of transportation was first formed in 2013 by Elon Musk, the founder of SpaceX and co-founder of Tesla Motors. As the possible fifth mode of transit, Hyperloop would be able to transport people at high subsonic speeds, e.g. Cincinnati to Chicago in a mere 30 minutes.

SpaceX is hosting a Hyperloop Design Competition to build a pod that can cruise through a one mile test track at 760 mph. Hence, **Hyperloop UC**, an interdisciplinary team of students, was formed.

UC is the only university from Ohio to advance to the final round of the international SpaceX Hyperloop Pod Competition and will be competing against 30 teams from around the world later this summer.

Faculty Awards

National Recognition

Marc Cahay, PhD, *Professor of Electrical Engineering and Computing Systems, was recently elected to Fellowship in the American Association for the Advancement of Science.*

Kristin Yvonne Rozier, PhD, *Assistant Professor of Aerospace Engineering, received the prestigious National Science Foundation (NSF) CAREER Award to further investigate "Theoretical Foundations of the UAS in the NAS Problem (Unmanned Aerial Systems in the National Air Space)."*

Andrew J. Steckl, PhD, *Steckl is the Carl Gieringer Professor, Ohio Eminent Scholar of Microelectronics and Distinguished Research Professor was named Fellow of the National Academy of Inventors.*

David Wendell, PhD, *Assistant Professor of Environmental Engineering received the esteemed National Science Foundation (NSF) CAREER Award to further investigate "Engineering a Target Selective Biological Photocatalyst for Water Disinfection."*

University Recognition

Kelly Cohen, PhD, *Professor of Aerospace Engineering and Engineering Mechanics, received the University of Cincinnati Mrs. A.B. "Dolly" Cohen Award for Excellence in Teaching.*

Urmila Ghia, PhD, *Professor Emerita, Mechanical Engineering, received the University of Cincinnati Provost's Faculty Career Award.*

50 in 5 New Faculty

As we continue on our five-year effort made possible by the inititiatives of Provost Beverly Davenport to add 50 new world-class faculty to our ranks we welcomed these 13 faculty who have proven expertise in their respective fields. They are certain to enhance the college with their rich experiential backgrounds and innovative research. Their research interests are highlighted below.

MICHAEL **ALEXANDER-RAMOS** | PhD in mechanical engineering, University of Michigan.
Multidisciplinary design modeling and optimization; decomposition-based system design optimization; surrogate modeling/metamodeling in engineering analysis and design; automotive systems design; electric/hybrid-electric vehicle design; dynamic systems modeling; structural design.

JE-HYEONG **BAHK** | PhD in electrical and computer engineering, University of California.
Wearable energy harvesting; thermoelectric energy conversion; nanoscale electron/thermal transport physics; additive manufacturing of functional materials and nanoscale devices.

CLARISSA **BELLONI*** | PhD in engineering science, University of Oxford.
Hydrokinetic turbines; small and micro-hydro power; river resource assessment; computational fluid dynamics; wind energy.

YUE **CUI** | PhD in chemical engineering, Hong Kong University of Science and Technology.
Bionanotechnology; biosensors; nanosensors; flexible bioelectrics: chemical sensors; bio-inspired materials; smart materials; multifunctional materials; self-assembly; actuators.

ABHIJEET **DESHPANDE*** | PhD in civil engineering, University of Cincinnati.
Building Information Modeling (BIM) tools for site utilization planning, knowledge management in architectural, engineering and construction projects.

WHITNEY **GASKINS*** | PhD in biomedical engineering, Univ. of Cincinnati.
Professional development of faculty and graduate students; assessment of undergraduate chronic stress and its sources; collaborative education models, and pedagogy.

RASHMI **JHA** | PhD in electrical engineering, North Carolina State University.
Nanoelectronic devices; enabled future neuromorphic computing systems; resistive RAM devices; spintronics; neuroscience and cognitive modeling; neuroelectronics; emerging nanoscale devices; enabled cyber-security systems; invisible logic and memory devices for wearable computing; solid oxide battery devices, and energy harvesting devices.

MANISH **KUMAR**| PhD in mechanical engineering, Duke University.
Unmanned aerial vehicles; decentralized control of multi-robot systems; fusion of data in distributed environment; resource management in complex, uncertain environment; biologically inspired methods for control; control and optimization in large-scale networked environment.

TAMARA **LORENZ** | PhD, Ludwig-Maximilians Universität, Munich Germany. Dual appointment in the UC College of Arts & Sciences.
Human joint action; human-robot interaction, human-machine interaction; human movement coordination including synchronization and adaptation; human behavior modeling; cognition-perception-action cycle; embodied cognition, cognitive psychology; nonlinear methods and synamical systems including dynamical neuroscience; human factors and ergonomics.

JING **SHI** | PhD in industrial engineering, Purdue University.
Advanced materials and manufacturing; modeling of renewable energy systems and healthcare delivery; RFID and wireless sensor network technologies; energy storage technologies.

MAOBING **TU** | PhD in forest products biotechnology, University of British Columbia; PhD in biochemical engineering, East China University of Science & Technology
Bioprocess engineering; biofuels and bioenergy; biomass processing chemistry; NMR analysis of carbohydrates and lignin; yeast and bacterial metabolomics, and functional biomaterials.

JULIAN **WANG** | PhD in architecture, Texas A & M University; Doctor of Engineering, Building Systems, Tianijin University.
Sustainable design; building systems; building technology; building envelopes; daylighting; healthcare research; bio-inspired design; BIM; smart buildings.

WEI **WEI*** | PhD in aerospace engineering, University of Cincinnati.
Aircraft/rotorcraft systems; UAV/UAS systems; operating/piloting; system identification; modeling; simulation; instrumentation; flight testing; data processing; handling quality analysis and evaluation; flight controller design and optimization.

**Assistant Professor Educator*

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The University does not tolerate discrimination, harassment, or retaliation on these bases and takes steps to ensure that students, employees, and third parties are not subject to a hostile environment in University programs or activities.

The University responds promptly and effectively to allegations of discrimination, harassment, and retaliation. It promptly conducts investigations and takes appropriate action, including disciplinary action, against individuals found to have violated its policies, as well as provides appropriate remedies to complainants and the campus community. The University takes immediate action to end a hostile environment if one has been created, prevent its recurrence, and remedy the effects of any hostile environment on affected members of the campus community.

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Tamie Grunow
Sr. Associate Vice President & Chief
Human Resources Officer
Section 504, ADA, Age Act Coordinator
340 University Hall, 51 Goodman Drive
Cincinnati, OH 45221-0039

Phone: 513-556-6381
Email: tamie.grunow@uc.edu

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Karla Phillips
Interim Title IX Coordinator
3115 Edwards 1, 45 Corry Blvd
Cincinnati, OH 45221
Phone: 513-556-3349
Email: karla.phillips@uc.edu

Handles inquiries regarding discrimination, harassment, or retaliation based on sex, sexual orientation, gender, and gender identity or expression.

Ronald Rateau
Assistive Technology Specialist
210 University Pavilion
Cincinnati, OH 45221
Phone: 513-556-6823
TTY: 513-556-3277
Fax: 513-556-1383
Relay: 711
Email: ronald.rateau@uc.edu

Handles inquiries regarding the accessibility of electronic and information technology.

ENGINEERING & APPLIED SCIENCE

UNIVERSITY OF Cincinnati

College of Engineering
and Applied Science
2901 Woodside Drive
Cincinnati, OH 45221-0018

WE ENGINEER BETTER™