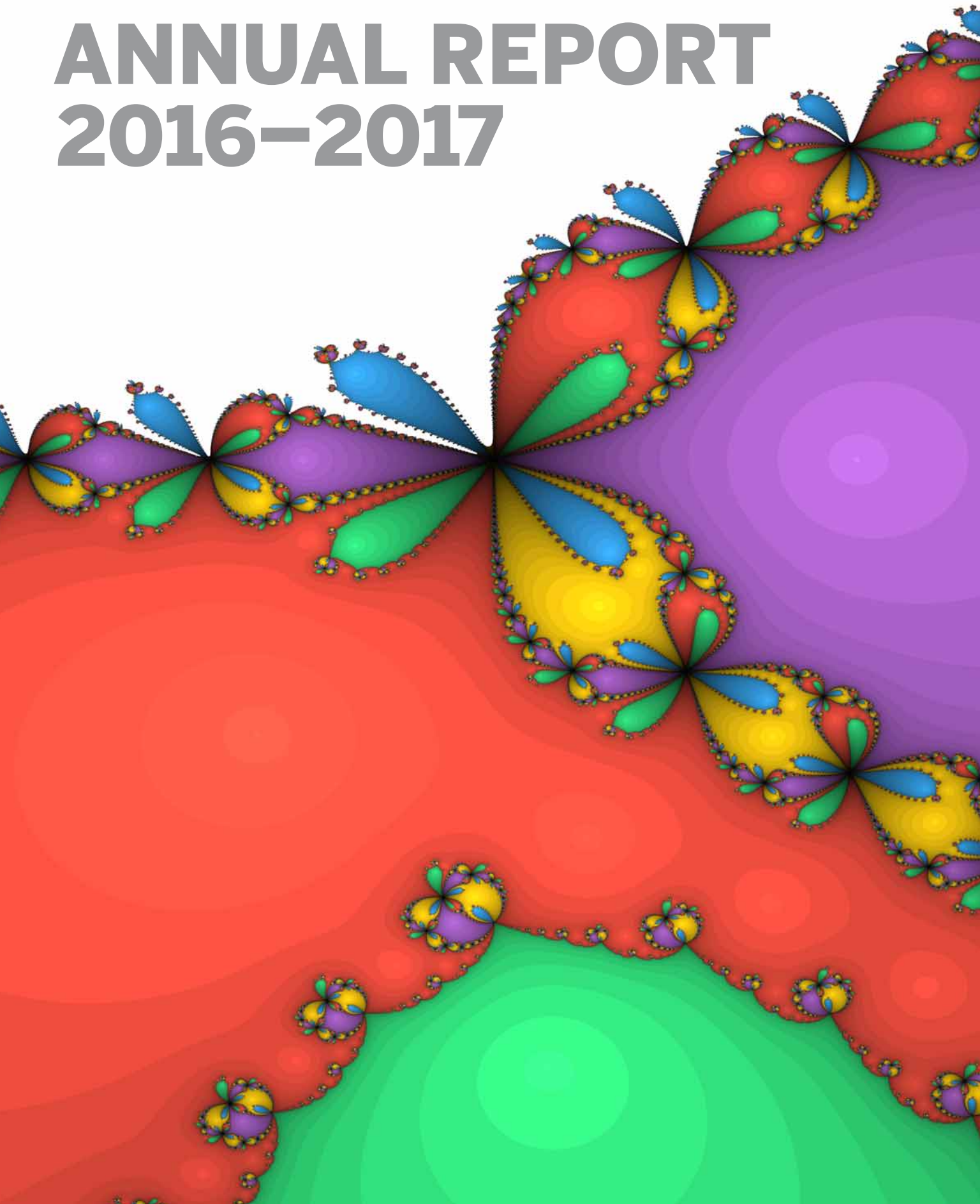The University of Texas at Austin
College of Natural Sciences

ANNUAL REPORT
2016–2017

MESSAGE FROM THE DEAN

Dear College of Natural Sciences Community and Friends,

Higher education is going through a period of examination and change. Still, the demand is high for the vital work that we do: leading new research discoveries that impact lives and transform knowledge of the universe; training a well-educated and science-literate workforce and citizenry; and communicating clearly about the value of higher education and science in our world.
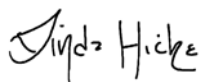
Key Accomplishments of 2016–2017 include:
- The 21st Century Graduate Education Implementation Task Force produced a set of strategic actions to enhance the educational experiences of graduate students throughout the College and allow for transformative new efforts—including in mentoring, professional skill-building, elective classes, and more—that prepare more Ph.D. graduates for success in positions, both within and outside of academia.
- Three 21st Century Undergraduate Education Implementation Task Forces completed work on action plans to reform curriculum, improve teaching evaluation and expand experiential learning opportunities for undergraduates.
- Renovations were initiated in the 1978 wing of Welch Hall and completed in several parts of the College, including on the first floor of the Norman Hackerman Building where new and modern labs for teaching and the Freshman Research Initiative are now in place.
- The Texas Institute for Discovery Education in Science hired curriculum and instruction consultants to support curriculum reform in six departments in the upcoming academic year.
- A faculty-led task force addressing diversity and inclusion needs across the College developed recommendations to reduce biases and ensure a welcoming climate in CNS.

- With all students engaged in CNS Cornerstones, a program that ensures ongoing support and guidance for all students, the four-year graduation rate for undergraduates hit an all-time high.
- Two new research centers were introduced: The Biodiversity Center, based in the Department of Integrative Biology, and the Center for Theoretical and Computational Neuroscience in the Department of Neuroscience.
- The College increased stipends for graduate student teaching assistants by almost 10 percent.

In the year ahead, we will continue to work on the priorities identified by our faculty-led strategic task force groups, so that the College of Natural Sciences remains a national leader in cutting-edge science, technology and math education and world-changing scientific breakthroughs.

Linda Hicke
Dean, College of Natural Sciences

The College of Natural Sciences has a mission of providing research-enhanced education and educationally connected research. In a series of new 21st Century initiatives related to undergraduate education, graduate education and research, we carry out our mission in three key areas:
- developing scientific leaders
- promoting world-changing discovery, and
- communicating our impact to Texas, the nation, and the world.

For more on the College's initiatives, visit us online at **cns.utexas.edu**.

DEVELOPING SCIENTIFIC LEADERS

AT A GLANCE

347

tenured and tenure-track faculty

18

new tenured and tenure-track faculty recruited and hired

1,213

graduate students

13

students awarded National Science Foundation Research Fellowships

9,868

undergraduates (Spring 2017)

2,650

graduates

Highest 4-Year Graduation Rate on Record

FACULTY LEADERS

Tenure-Track Faculty by Department

2016–2017	
ASTRONOMY	**20**
CHEMISTRY	**25**
COMPUTER SCIENCE	**45**
HUMAN DEVELOPMENT AND FAMILY SCIENCES	**12**
INTEGRATIVE BIOLOGY	**34**
MARINE SCIENCE	**15**
MATHEMATICS	**51**
MOLECULAR BIOSCIENCES	**59**
NEUROSCIENCE	**25**
NUTRITIONAL SCIENCES	**7**
PHYSICS	**50**
STATISTICS AND DATA SCIENCES	**1**
TEXTILES AND APPAREL	**3**
Total	**347**
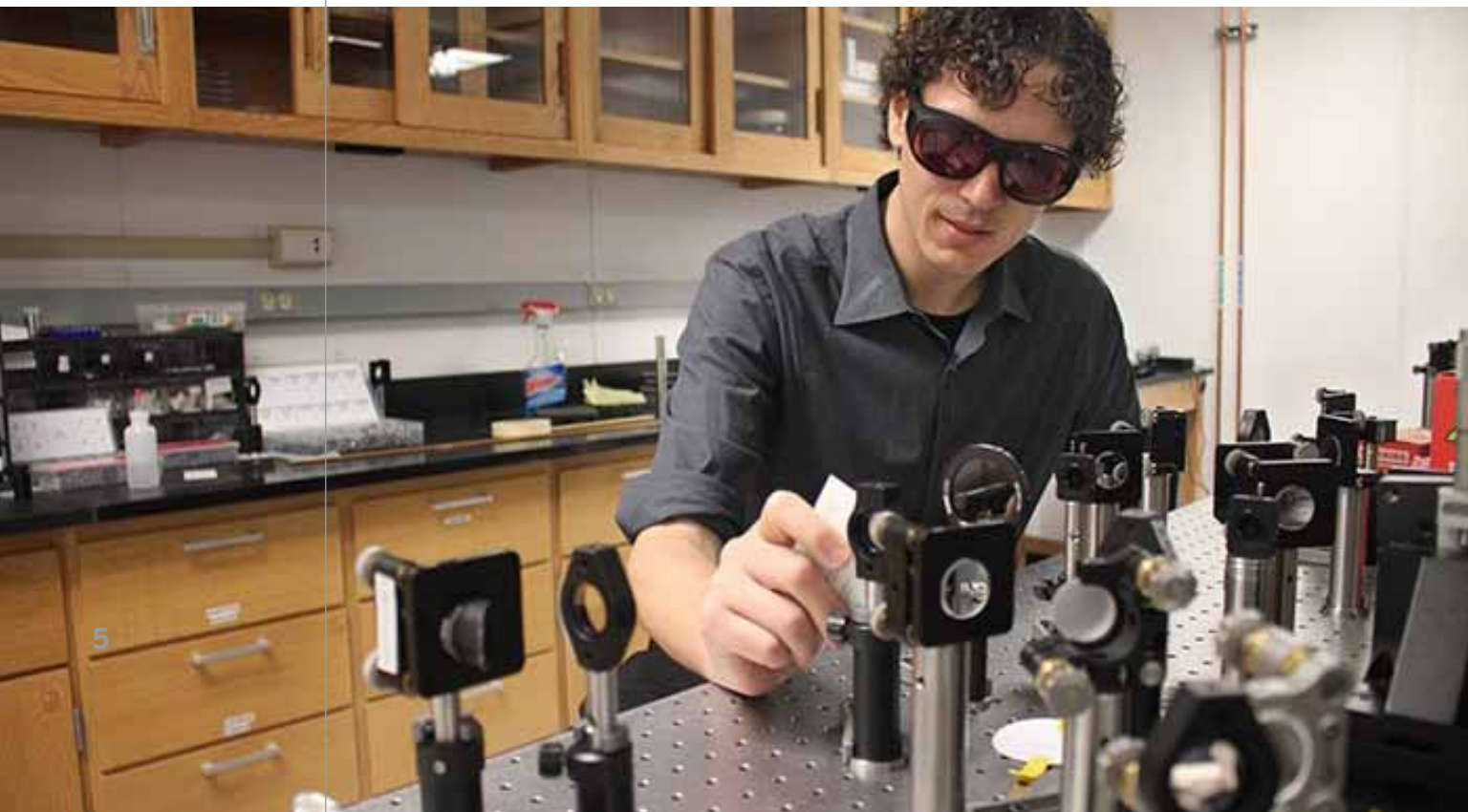
New Faculty Joining the College

Brendan Bowler, Assistant Professor – Department of Astronomy
Brendan Bowler's research focuses on the formation, architecture, and atmospheres of extrasolar planets by directly detecting their photons at infrared wavelengths. Bowler uses the largest telescopes in space and on the ground together with adaptive optics to image exoplanets and spectroscopically characterize their atmospheres. He is also interested in the statistical properties of planets and their evolution over time. Bowler received his Ph.D. from the University of Hawaii's Institute for Astronomy in 2013. He was a postdoctoral fellow at the California Institute of Technology from 2013 to 2015, a McDonald Observatory Postdoctoral Fellow at the University of Texas at Austin from 2015 to 2016, and since 2016 has been a Hubble Postdoctoral Fellow at UT Austin.

Elena Caceres, Assistant Professor – Department of Physics
Elena Caceres's research interests lie in the area of string theory and quantum gravity. She has worked on different aspects of gauge/gravity duality, supergravity solutions and black holes. Her current work focus is the relationship between quantum information constructs and holography and the insights they provide into the fundamental nature of spacetime. She received her undergraduate degree in physics from Universidad Catolica in Lima, Peru, and her Ph.D. in physics from The University of Texas at Austin. She was a postdoctoral fellow at UCLA and the International Center for Theoretical Physics in Trieste, Italy. Before joining the faculty at UT Austin she was a professor at Universidad de Colima, Mexico. Caceres is passionate about science outreach. Since 2010, she has been a member of the Mexican Academy of Science.

Xiaoli "Lulu" Cambronne, Assistant Professor – Department of Molecular Biosciences
Lulu Cambronne's current research focuses on understanding how metabolites impact cellular signaling cascades and epigenetic regulation. The approach is to develop fluorescent biosensors for tracking the subcellular availability of specific metabolites. Cambronne received a Hon.B.Sc in Molecular Genetics from the University of Toronto, a Ph.D. with Wade Harper from the Division of Medical Sciences at Harvard University, and postdoctoral training under Richard Goodman in microRNA target identification as well as NAD+ biology at the Vollum Institute. Cambronne is the recipient of numerous awards, including the Kirschstein National Service Research Award and the Albert J. Ryan and Samuel Lunenfeld Fellowship. At Oregon Health and Science University, she was named the 2013 New Inventor of the Year for her development and commercialization of the RISC-trap/miR-trap assay to empirically identify targets for specific microRNAs in cells.

Daniel Dickinson, Assistant Professor – Department of Molecular Biosciences
Daniel Dickinson's research focuses on the molecular mechanisms of cell polarization, which is a basic property of animal cells that is often disrupted in human diseases (especially cancer). He uses a unique, interdisciplinary approach that combines single-molecule microscopy, targeted genome editing, biochemistry and fluorescence imaging of living cells. Dickinson received his B.S. in biochemistry from Iowa State University in 2005, then spent a year as a Fulbright scholar in Switzerland before earning a Ph.D. at Stanford in 2011. Prior to joining UT, he was a postdoctoral fellow at the University of North Carolina at Chapel Hill.

Gregory Durrett, Assistant Professor – Department of Computer Science
Greg Durrett's research focuses on solving core natural language processing (NLP) problems, all of which are fundamentally concerned with turning unstructured text into structured information. This kind of text processing is a critical step for allowing computers to access all of the information that's available on the web. Durrett's work uses structured machine learning methods, especially joint models that integrate multiple approaches or address multiple tasks simultaneously. He has studied a range of NLP problems including coreference resolution, entity linking, syntactic parsing, and document summarization. Durrett completed his Ph.D. at UC Berkeley and was the recipient of numerous awards, including the Facebook Fellowship in Natural Language Processing and an NSF Graduate Research Fellowship.

Marcel Goldschen-Ohm, Assistant Professor – Department of Neuroscience
Marcel Goldschen-Ohm's research focuses on single-molecule approaches as a means to probe the dynamic motions of proteins that underlie their biological function. He is particularly interested in developing novel approaches to resolve the interplay between distinct domains within individual proteins. He obtained his Ph.D. from the University of Wisconsin – Madison in 2009, where he also did his postdoctoral research in ion channel biophysics. Goldschen-Ohm has received recognition over the years, including fellowships from the Epilepsy Foundation and American Heart Association and invitations to speak at international conferences including Gordon Research Conferences and Biophysical Society annual meetings.

Alexander Huth, Assistant Professor – Departments of Computer Science and Neuroscience
Alex Huth works in computational and experimental neuroscience using fMRI. His research is focused on how the many different areas in the human brain work together to perform complex tasks such as understanding natural language. He uses fMRI to measure brain responses while subjects do real-life tasks, such as listening to a story, using the data to build computational models of how the brain functions. Huth earned his Ph.D. through the Helen Wills Neuroscience Institute at the University of California, Berkeley, where he also conducted his postdoctoral research in the laboratory of Jack Gallant. Before that, Huth earned both his bachelor's and master's degrees in computation and neural systems at the California Institute of Technology. He was awarded a Burroughs Wellcome Career Award in 2016.

Elma I. Lorenzo-Blanco, Assistant Professor – Department of Human Development and Family Sciences
Elma Lorenzo-Blanco's research investigates how issues related to culture, ethnicity, gender, family, and media influence the health and wellbeing of Latinx youth and families in the U.S. and Latin American countries. The long-term goal of Lorenzo-Blanco's work is to develop social justice-oriented preventive interventions to improve Latinx health and well-being. After earning her Ph.D. in clinical psychology and women's studies from the University of Michigan, Lorenzo-Blanco was an assistant professor in clinical/community psychology at the University of South Carolina.

Joseph Neeman, Assistant Professor – Department of Mathematics
Joe Neeman is interested in probability and many of its applications, ranging from computer science and statistics to geometry. Most recently, he has worked on problems involving random graphs (for example, trying to detect community structures in them) and on isoperimetric-type inequalities. He received his Ph.D. from the University of California, Berkeley, and he was a postdoctoral researcher at UT Austin. Most recently, he was a Bonn Junior Fellow in Bonn, Germany.

Stella Offner, Assistant Professor – Department of Astronomy
Stella Offner's research uses hydrodynamic simulations, telescope observations and radiative transfer modeling to understand how stars form. Her work has broader implications for the evolution of galaxies and the initial conditions of planetary systems. She is also interested in statistical data analysis and machine learning as a means to characterize structure and extract physical properties from observational data. Offner received her bachelor's degree from Wellesley College and her Ph.D. from the University of California, Berkeley. She held an NSF Postdoctoral Fellowship at the Harvard-Smithsonian Center for Astrophysics and was then awarded a Hubble Postdoctoral Fellowship, which she carried out at Yale. She spent the most recent three years as an assistant professor in the Astronomy Department at University of Massachusetts Amherst, where in 2017, she received an NSF Faculty Early Career Award.

Abhra Sarkar, Assistant Professor – Department of Statistics and Data Sciences
Abhra Sarkar's research interests center around the development of novel statistical approaches that improve results and practice in an initial motivating application area while also having broad general utility. He develops sophisticated Bayesian non and semiparametric methods that accommodate a wide range of data-generating processes, adapting to different levels of data complexity. Sarkar's works have won him prestigious student paper awards and research fellowships. He obtained his Ph.D. in statistics from Texas A&M University, College Station. Prior to joining UT Austin, he was a postdoctoral associate at Duke University.

Eric Senning, Assistant Professor – Department of Neuroscience
Eric Senning's research explores the neurons of our senses with an emphasis in understanding how ion channels affect their excitability. He is interested in how the context of the cellular environment serves to regulate the activity of ion channels and uses single molecule fluorescence techniques. Senning received his Ph.D. from the University of Oregon in 2009. He did postdoctoral research at the University of Washington, Seattle.

Ngoc Tran, Assistant Professor – Department of Mathematics
Ngoc Mai Tran uses tools from tropical geometry and probability to create novel applications of mathematics in economics, neuroscience and other sciences. Her current research focuses on applications of tropical geometry in economics, combinatorial stochastic processes, and applications of discrete mathematics in neuroscience. She obtained her Ph.D. in statistics at the University of California, Berkeley in 2013 after which she conducted her postdoctoral research at UT Austin. She is the recipient of prestigious fellowships including a Simons Postdoctoral Fellowship and a Bonn Junior Fellowship.

Hannah Williamson, Assistant Professor – Department of Human Development and Family Sciences
Hannah Williamson's research focuses on strengthening families, particularly among underserved groups, including low-income and ethnic minority couples. She conducts basic and applied studies that examine relationship processes and test various theoretically derived intervention strategies for disadvantaged couples. Williamson received her B.A. in psychology from the University of Rochester in 2008 and her Ph.D. in clinical psychology from the University of California, Los Angeles in 2017. Her work has been funded by the National Science Foundation and the Administration for Children and Families. She has received recognition from numerous organizations, including the American Psychological Association, Psi Chi, APA Division 1 (General Psychology), APA Division 12 (Society of Clinical Psychology), and the Society for a Science of Clinical Psychology.

Faculty scheduled to join the College in the year ahead

Justin Havird, Assistant Professor, Department of Integrative Biology
Keith Hawkins, Assistant Professor, Department of Astronomy
Melissa Kemp, Assistant Professor, Department of Integrative Biology
Sam Raskin, Assistant Professor, Department of Mathematics

Major Faculty Research and Teaching Awards

2016–2017 Faculty Research Award Recipients

Fellows of the American Association for the Advance of Science (AAAS)
Inderjit S. Dhillon | Departments of Mathematics and Computer Science
Kristen Harris | Department of Neuroscience
Daniel Johnston | Department of Neuroscience
Mark Kirkpatrick | Department of Integrative Biology

Fellows of the American Physical Society
Greg Fiete| Department of Physics
Karol Lang | Department of Physics

Fellow of the Ecological Society of America & Alexander von Humboldt Research Award
Mathew Leibold | Department of Integrative Biology

National Council on Family Relations Fellow
Stephen Russell | Department of Human Development and Family Sciences

National Science Foundation Faculty Early Career Development (CAREER) Award
    Andrew Potter | Department of Physics
    Sean Roberts | Department of Chemistry

Joseph I. Lieberman Award for Excellence in Science and Technology, Center for Excellence in Education
    Lauren Meyers | Department of Integrative Biology

2016 IMA Prize in Mathematics and its Applications
    Rachel Ward | Department of Mathematics

2017 Molecular Ecology Prize
    Nancy Moran | Department of Integrative Biology

Alfred P. Sloan Foundation Fellow
    Thibaud Taillefumier | Departments of Mathematics and Neuroscience

2017 Marion Milligan Mason Award for Women in the Chemical Sciences (AAAS)
    Livia Eberlin | Department of Chemistry

2017 Ernest Guenther Award (American Chemical Society)
    Stephen Martin | Department of Chemistry

2017 Distinguished Animal Behaviorist Award (Animal Behavior Society)
    Michael Ryan | Department of Integrative Biology

Ed Stiefel Young Investigator Award
    Michael Rose | Department of Chemistry

2017 ANACHEM Award (Federation of Analytical Chemistry and Spectroscopy Societies)
    Jennifer Brodbelt | Department of Chemistry

Howard Hughes Medical Institute Faculty Scholar
    Ila Fiete | Department of Neuroscience

2017 Harry H. Goode Memorial Award (Institute of Electrical and Electronics Engineers Computer Society)
    Jayadev Misra | Department of Computer Science

International Cooperation Award, International Congress of Chinese Mathematicians
    Björn Engquist | Department of Mathematics

International Council for the Exploration of the Sea Award
    Bryan Black | Department of Marine Science

National Academies of Sciences, Engineering, and Medicine Gulf Research Program Early-Career Research Fellowship
    Brad Erisman | Department of Marine Science

2016–2017 Faculty Teaching Awards Recipients

Academy of Distinguished Teachers
Kristen Grauman | Department of Computer Science

Regents Outstanding Teaching Awards
Uri Treisman | Department of Mathematics

President's Associates Teaching Excellence
John Markert | Department of Physics
Alison Norman | Department of Computer Science
Shelley Payne | Department of Molecular Biosciences

Dads' Association Centennial Teaching Fellowships
Kristin Harvey | Department of Statistics and Data Sciences
Steven Finkelstein | Department of Astronomy

Provost's Teaching Fellows
Christina Markert | Department of Physics
Alison Norman | Department of Computer Science

Texas Exes' "Texas 10" Teaching Award
Kate Biberdorf | Department of Chemistry

### University of Texas at Austin Professor of the Year
Jessie Zhang | Department of Molecular Biosciences

GRADUATE STUDENT LEADERS

The College has made one of its top priorities to recruit and support excellent, diverse graduate students across 15 academic programs. As we have focused on providing a quality experience for the very best students, the number of graduate students in the College has decreased and the stipends for graduate students have increased.

Total Number of Graduate Students (Ph.D. and Master's) in CNS
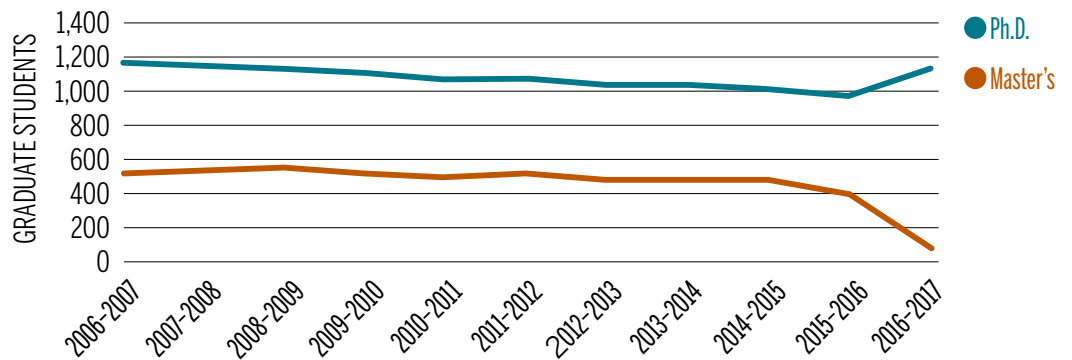
Major Graduate Student Awards in 2016–17

NSF-Graduate Research Fellow Awardees:
Christina Baletine | Ecology, Evolution and Behavior
Manual Dominguez | Chemistry
Andrea Hannasch | Physics
Grace Kago | Cell and Molecular Biology
Lucy LeBlanc | Microbiology
Mackenzie Meece-Rayle | Chemistry
Jordan Villa | Biochemistry
Matthew Whitmire | Neuroscience

NSF-Graduate Research Fellow Honorable Mentions:
Arun Debray | Mathematics
Suzanne Jacobs | Physics
Calla McCulley | Chemistry
Joshua Pender | Chemistry
Mark Sherman | Cell and Molecular Biology

NIH National Research Service Award Predoctoral Fellows
Brian Bondy | Neuroscience
Emma Erickson | Cell and Molecular Biology
Rachel Lex | Cell and Molecular Biology
Andrew Nelson | Chemistry, M.D./Ph.D.
Alfire Sidik | Cell and Molecular Biology
Charles Traverse | Microbiology
Christopher Tulisiak | Neuroscience
Anna Warden | Neuroscience
Charles Zogzas | Biochemistry

National Cancer Institute Predoctoral to Postdoctoral Fellow Transition Award
Logan Myler | Cell and Molecular Biology

Department of Energy Office of Science Graduate Student Research Award
Ryan Pekarek | Chemistry

National Defense Science and Engineering Graduate Fellowship
Lauren Castro | Ecology, Evolution and Behavior

Environmental Protection Agency Science to Achieve Results (STAR) Graduate Fellowship
Arley Muth | Marine Science

Ford Foundation Fellowship
Kelly Wallace | Ecology, Evolution and Behavior

Google Ph.D. Fellowship
Yu-Chuan Su | Computer Science

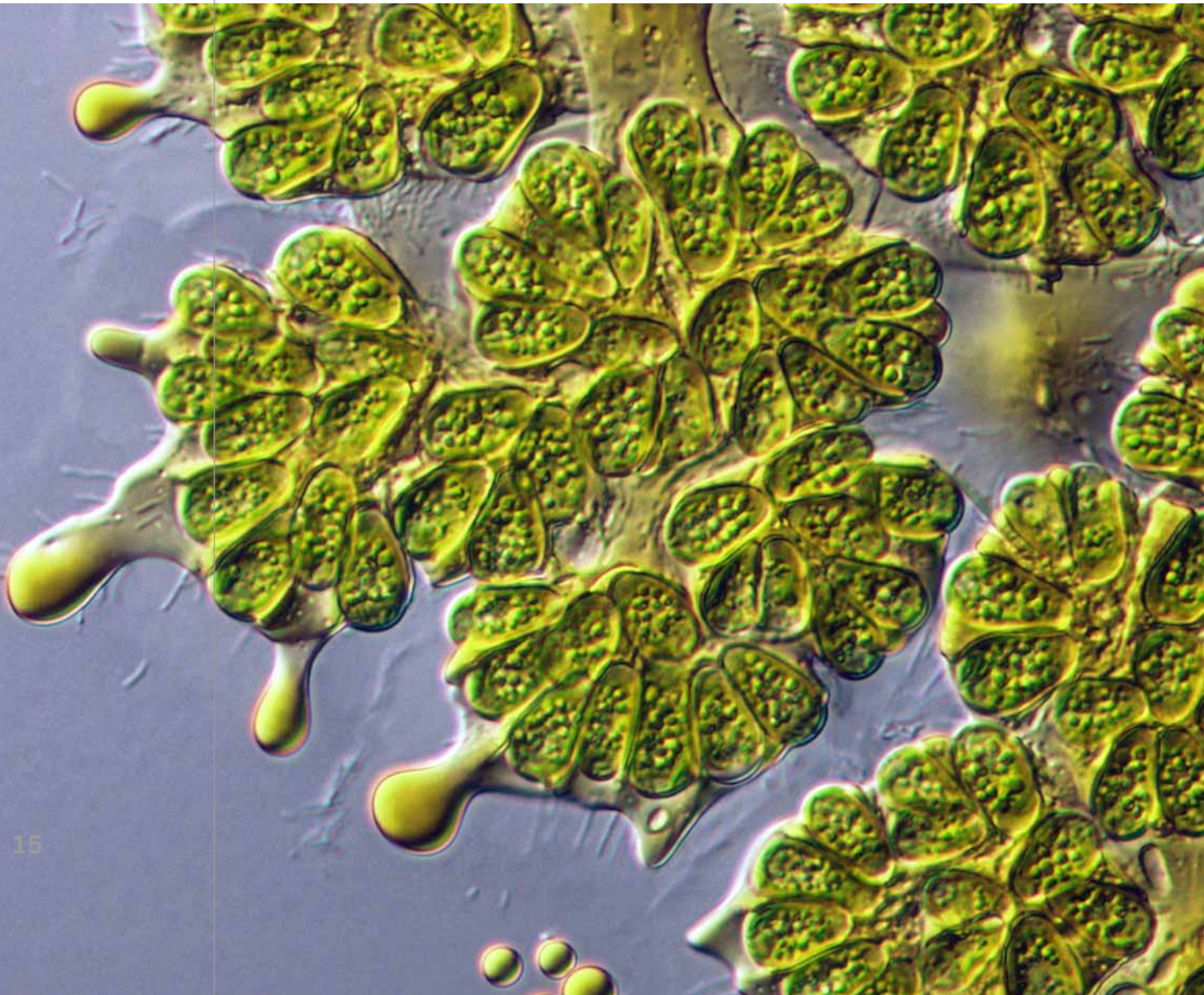**NASA Earth and Space Science Fellowship**
Raquel Martinez | Astronomy
Intae Jung | Astronomy

North Pacific Research Board Graduate Student Research Award
Craig Connolly | Marine Science

American Heart Association Predoctoral Fellowship
Victoria Le | Cell and Molecular Biology

UNDERGRADUATE STUDENT LEADERS

Ongoing initiatives to help undergraduate students succeed in their studies with timely progress toward a degree have continued to increase four-year graduation rates in the College. Today, the number of students who experience academic probation or who quit, fail, or drop core science and mathematics classes is dramatically lower than it was five years ago. As more seniors walk across the graduation stage within four years, the freshman class continues to grow.

Undergraduate Enrollment by Major in 2016–17
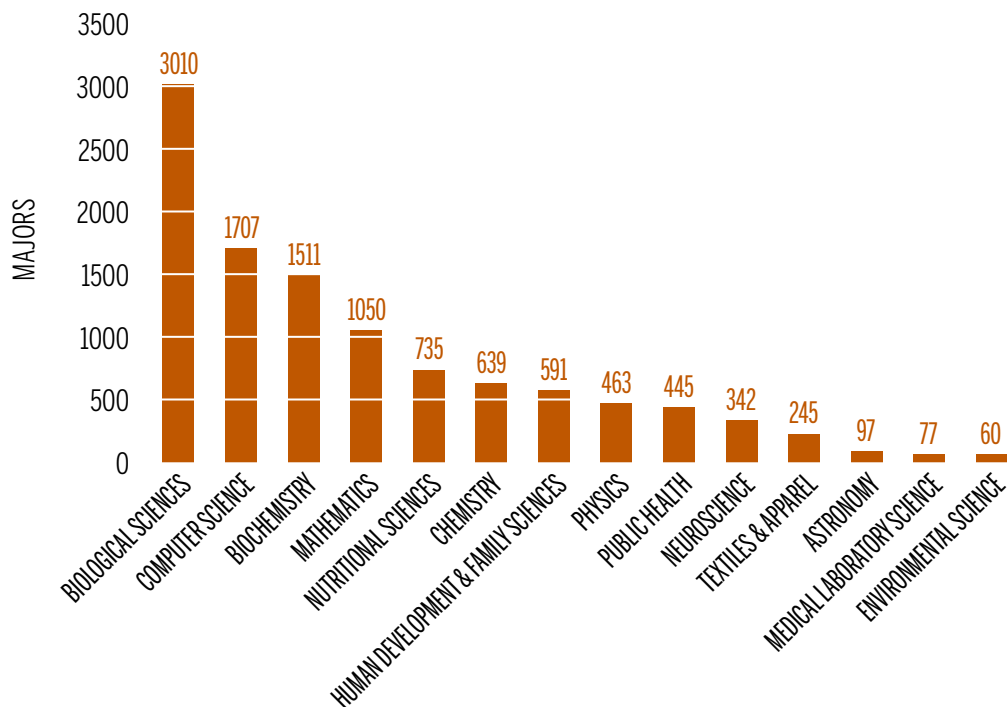
Graduating Class of 2017 – Undergraduate Degrees Awarded

● B.S.A.
● B.S.
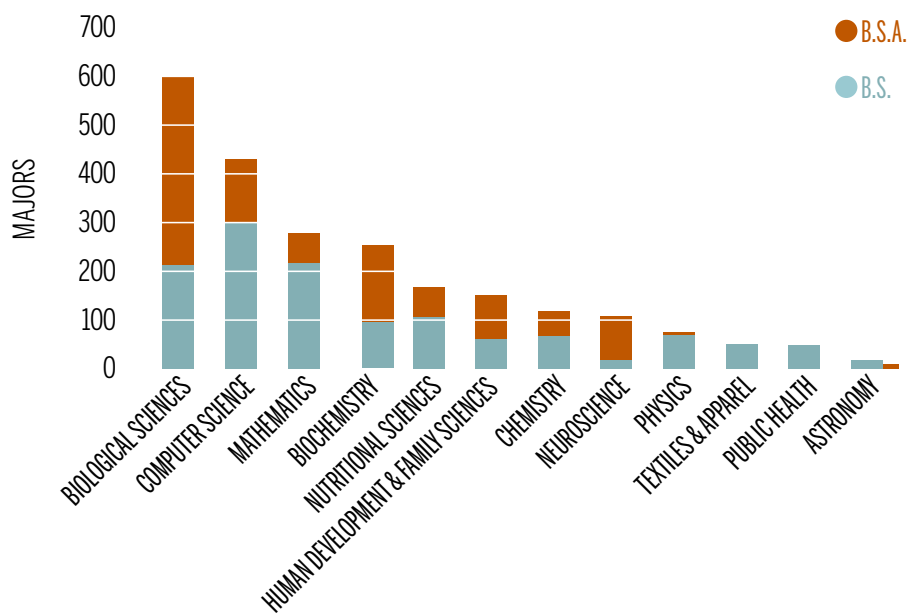
2016–17 Fall & Spring Graduates

self-reported demographic data comes from the graduates who completed the graduation survey

Total Number of Graduates	2,650
Male/Female	55% Female; 47% Male
Underrepresented Minority	24%
Transferred into CNS	41%
Internship	47%
Graduated in 4 Years	74%
Participated in FRI	32%

Self-Reported Pathways after Graduation

	B.S.	B.S.A./B.A.
Seeking/Secured a Job	60%	46%
Health Professions School	13%	30%
Graduate School	15%	10%
Other (military, Peace Corps, etc.)	12%	14%

Major Undergraduate Student Awards in 2016–17:

NSF Graduate Research Fellowships Program Awardees
   Dylan Airey | Mathematics and Dean's Scholars
   Gualberto Guzman | Computer Science
   Michael Miyagi | Biology and Dean's Scholars
   Nicholas Prescott | Biochemistry/Spanish and Dean's Scholars
   Luis Valencia |Biochemistry and Dean's Scholars
   Ellen Zippi | Neuroscience and Dean's Scholars
Mitchell Award Winners
   Gabrielle McRoberts | Neuroscience and Plan II Honors
   Bronwyn Scott | Biochemistry, Plan II and Polymathic Scholars
Goldwater Award Honorable Mentions
   Wesley Godfrey | Biology and Health Science Scholars
   Hannah Hasson | Physics and Astronomy, Dean's Scholars
   Carl Marth | Physics and Astronomy, Dean's Scholars
Astronaut Foundation Scholar
   James Sullivan | Mathematics, Physics and Astronomy

PROMOTING WORLD-CHANGING DISCOVERY

AT A GLANCE

11
members of the National Academy of Sciences

Groundbreaking initiated in 1978 wing of Welch Hall

Biodiversity Center established in Department of Integrative Biology

$101.4 million
in sponsored research funding

SELECTED HIGH-PROFILE PUBLICATIONS

Diehl, K. L., Kolesnichenko, I. V., Robotham, S. A., Bachman, J. L., Zhong, Y., **Brodbelt J. S.** & **Anslyn, E.** Click and chemically triggered declick reactions through reversible amine and thiol coupling via a conjugate acceptor. *Nature Chemistry* **8**(10), 968-973 (2016)

Deatherage, D.E., Kepner, J., Bennett, A. F., Lenski, R. E. & **Barrick, J.** Specificity of genome evolution in experimental populations of *Escherichia coli* evolved at different temperatures. *Proceedings of the National Academy of Sciences USA* **114**(10), E1904-E1912 (2017)

Hou, Y., **Kim, S. Y.**, **Hazen, N.** & **Benner, A.** Parents' perceived discrimination and adolescent adjustment in Chinese American families. *Child Development* **88**(1), 317-331 (2017)

Bolnick, D. & Stutz, W. Frequency dependence limits divergent evolution by favouring rare immigrants over residents. *Nature* **546**(7657), 285-288 (2017)

Stuart, Y., Veen, T., Weber, J.N., Hansen, D., Ravient, M., Lohman, B. K., Thompson, C. J., Tasneem, T., Doggett, A., Izen, R., Ahmed, N., Barrett, R. D., Hendry, A. P., Peichel, C. L., & **Bolnick, D.** Contrasting effects of environment and genetics generate a continuum of parallel evolution. *Nature Ecology & Evolution* **1**(6), (2017); doi: 10.1038/s41559-017-0158

Caffarelli, L., Ros-Oton, X., & Serra, J. Obstacle problems for integro-differential operators: regularity of solutions and free boundaries. *Inventiones Mathematicae* **208**(3), 1155-1211 (2017)

Johansen J. L., Allan, B. J., Rummer, J. L., & **Esbaugh, A. J.** Oil exposure disrupts early life-history stages of coral reef fishes via behavioural impairments. *Nature Ecology & Evolution* **1**(8), 11-46 (2017)

Laurell, P. & **Fiete, G. A.** Topological magnon bands and unconventional superconductivity in pyrochlore iridate thin films. *Physical Review Letters* **118**(17), 177-201 (2017)

Jung, C., Hawkins, J. A., Jones, S. K., Xiao, Y., Rybarski, J. R., Dillard, K. E., Hussmann, J., Saifuddin, F.A., Savran, C. A., **Ellington, A. D.**, Ke, A., **Press, W. H.**, **Finkelstein, I. J.** Massively parallel biophysical analysis of CRISPR-Cas complexes on next generation sequencing chips. *Cell* **170**(1), 35-47 (2017)

Livermore, R.C., **Finkelstein, S. L.**, & Lotz, J.M. Directly Observing the Galaxies Likely Responsible for Reionization. *The Astrophysical Journal* **835**(2)**,** (2017); doi: 10.3847/1538-4357/835/2/113

Lee, J., Boutz, D. R., Chromikova, V., Joyce, M. G., Vollmers, C., Leung, K., Horton, A. P., DeKosky, B. J., Lee, C., Lavinder, J., Murrin, E. M., Chrysostomou, C., Hoi, K. H., Tsybovsky, Y., Thomas, P. V., Druz, A., Zhang, B., Zhang, Y., Wang, L., Kong, W., Park, D., Popova, L. I., Dekker, C. L., Davis, M. M., Carter, C. E., Ross, T. M., **Ellington, A. D.**, Wilson, P. C., **Marcotte, E. M.**, Mascola, J. R., Ippolito, G. C., Krammer, F., Quake, S. R., Kwong, P. D., & **Georgiou, G.** Molecular-level analysis of the serum antibody repertoire in young adults before and after seasonal influenza vaccination. *Nature Medicine* **22**(12), 1456–1464 (2016)

Cramer, S. L., Saha, A., Liu, J., Tadi, S., **Tiziani, S., Zhang, J.,** Triplett, K., Lamb, C**.,** Alters, S. E., Rowlinson, S., Zhang, Y. J., Keating, M. J., Huang, P., DiGiovanni, J., **Georgiou, G.,** & Stone, E. Systemic depletion of L-cyst(e)ine with cyst(e) inase increases reactive oxygen species and suppresses tumor growth. *Nature Medicine* **23**(1), 120-127 (2016)

Gershoff, E. T. & Font, S. A. Corporal punishment in U.S. public schools: Prevalence, disparities in use, and status in state and federal policy. *Social Policy Report* **30**(1), 1-26 (2016)

Rodesney, C. A., Roman, B., Dhamani, N., Cooley, B. J., Katira, P., Touhami, A., & **Gordon, V. D.** Mechanosensing of shear by *Pseudomonas aeruginosa* leads to increased levels of the cyclic-di-GMP signal initiating biofilm development. *Proceedings of the National Academy of Science of the United States of America* **114**(23), 5906-5911 (2017)

Jayaraman, D. & **Grauman, K.** Learning image representations tied to egomotion from unlabeled video. *International Journal of Computer Vision*, (2017); doi.org/10.1007/s11263-017-1001-2

Hawkes, C. V., Waring, B. G., Rocca, J. D. & Kivlin, S. N. Historical climate controls soil respiration responses to current soil moisture. *Proceedings of the National Academy of Sciences of the United States of America* **114**(24), 6322-6327 (2017)

Yates, J. L., Park, I. M., Katz, L. N., Pillow, J. W. & **Huk**, **A. C.** Functional dissection of signal and noise in MT and LIP during decision-making. *Nature Neuroscience* **20**(9), 1285-1292 (2017)

Xin, R., Zhu, L., Salomé, P. A., Mancini, E., Marshall, C. M., Harmon, F. G., Yanovsky, M. J., Weigel, D. & **Huq, E.** SPF45-related splicing factor for phytochrome signaling promotes photomorphogenesis by regulating pre-mRNA splicing in *Arabidopsis. Proceedings of the National Academy of Sciences of the United States of America* **114**(33), E7018-E7027 (2017)

Bender, M., Turnbull, B. W. H., Ambler, B. R. & **Krische, M. J.** Ruthenium-catalyzed insertion of adjacent diol carbon atoms into C-C bonds: Entry to type II polyketides. *Science* **357**(6353), 779-781 (2017)

Nguyen, K. D., Park, B. Y., Luong, T., Sato, H., Garza, V. J. & **Krische, M. J.** Metal-catalyzed reductive coupling of olefin-derived nucleophiles: Reinventing carbonyl addition. *Science* **354**(6310), (2016); doi: 10.1126/science.aah5133

Ciraolo, G. & **Maggi, F.** On the Shape of Compact Hypersurfaces with Almost-Constant Mean Curvature. *Communications on Pure and Applied Mathematics* **70**(4), 665-716 (2017)

Kenkel, C. D. & **Matz, M. V.** Gene expression plasticity as a mechanism of coral adaptation to a variable environment. *Nature Ecology & Evolution* **1**(0014), (2016); doi: 10.1038/s41559-016-0014

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Powell, J. E., Leonard, S. P., Kwong, W. K., Engel, P. & **Moran, N. A.** Genome-wide screen identifies host colonization determinants in a bacterial gut symbiont. *Proceedings of the National Academy of Sciences of the United States of America* **113**(48), 13887-13892 (2016)

Zhou, Y., Lee, J., Jiang, W., Crowe, J. L., Zha, S. & **Paull, T. T.** Regulation of the DNA Damage Response by DNA-PKcs Inhibitory Phosphorylation of ATM. *Molecular Cell* **65**(1), 91-104 (2017)

Mack, M. L., Love, B. C. & **Preston, A. R.** Dynamic updating of hippocampal object representations reflects new conceptual knowledge. *Proceedings of the National Academy of Sciences of the United States of America* **113**(46), 13203-13208 (2016)

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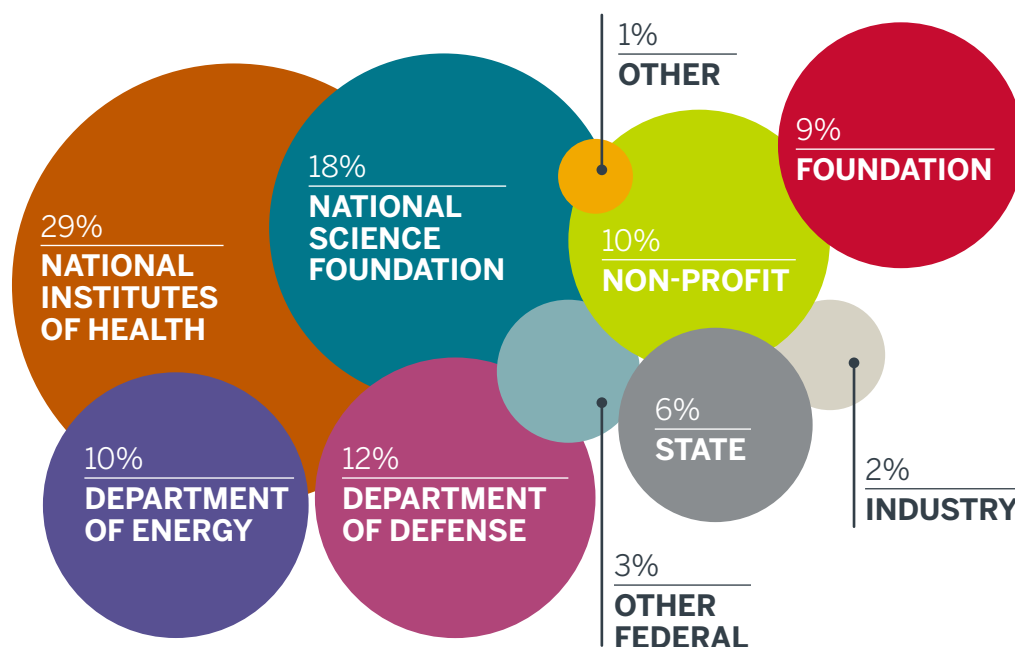
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SPONSORED RESEARCH TRENDS

Distribution of 2016–2017 CNS External Funding

- 1% OTHER
- 9% FOUNDATION
- 18% NATIONAL SCIENCE FOUNDATION
- 29% NATIONAL INSTITUTES OF HEALTH
- 10% NON-PROFIT
- 10% DEPARTMENT OF ENERGY
- 12% DEPARTMENT OF DEFENSE
- 6% STATE
- 2% INDUSTRY
- 3% OTHER FEDERAL

External Research Expenditure by Department

UNIT	2016–2017	Average per Faculty
Astronomy	$3,413,682	$148,421
Chemistry	$11,329,398	$404,621
Computer Sciences	$8,493,008	$202,214
Human Dev/Family Sciences	$1,727,985	$115,199
Integrative Biology	$6,630,148	$189,433
Marine Science	$7,055,677	$503,977
Mathematics	$4,173,044	$80,251
Molecular Biosciences	$26,534,729	$457,495
Neuroscience	$12,473,367	$498,935
Nutritional Sciences	$2,674,308	$297,145
Physics	$15,626,850	$289,386
Statistics & Data Sciences	$1,133,737	$566,869
Textiles & Apparel	$101,530	$25,383
Totals:	**$101,367,463**	**$280,796.30**

BUILDING RENOVATIONS

Welch Hall: Renovations that Reimagine the Heart of the College

In 2016, renovation of the 1929 (north) wing of Welch Hall was completed with new FRI labs, analytical chemistry teaching labs and active learning classrooms—innovative experimental learning environments. This renovation also created 17,500 square feet of state-of-the-art research laboratories for synthetic, analytical, and physical chemistry.

The final, and largest, piece of the New Welch Hall transformation, renovation of the 1978 wing, began in August 2017. This project will include all new mechanical systems, modern research and teaching labs, and an updated student space in the grand concourse. This final phase of the project should be completed in early 2020.

Norman Hackerman Building Additions

Mechanical and programming considerations of the Welch 1978 wing renovation required moving the old greenhouse on the roof, the biochemistry and FRI labs from the third floor, and the nuclear magnetic resonance facility in the basement of Welch. This has triggered three additional projects in the Norman Hackerman Building (NHB).

- A 4,300 square foot space on the first floor of NHB has been finished to provide new homes for the biochemistry teaching laboratory and an FRI lab. Students moved into these spaces in May 2017.
- A new 9,000 square foot research greenhouse is being built on the roof of NHB to replace the old greenhouse on the roof of Welch. This modern facility will support the research needs of our plant biologists for years to come. Move-in is scheduled for November 2017.
- A new NMR (nuclear magnetic resonance) facility is being constructed in the basement of NHB. This 1,900 square foot space will replace the NMR facility in the basement of Welch Hall, and was designed to house up to six instruments including a high-field NMR in the future. The instruments will be moving to their new home in the fall of 2017.

Patterson Hall: A Home for the Department of Integrative Biology

The Department of Integrative Biology moved into their new administrative suite on the first floor of Patterson Hall in September 2016. This newly renovated space includes offices for the department chair and staff, a conference room for faculty meetings and seminars, and an informal collaboration space for faculty and students at the main entrance to Patterson Hall.

Sauer Structural Biology Laboratory

A new structural biology core facility has been created in the basement of the Faulkner Nanoscience and Technology Building (FNT). This 2,500 square foot space houses two related core research facilities: our new cryo-electron microscopy facility, with two new instruments (Talos and Krios), as well as the macromolecular X-ray crystallography facility, which moved from Welch Hall. Part of the funding for this new laboratory came from a generous gift from the estate of Elizabeth Sauer, a 1966 UT alumna, in celebration of her sister-in-law, Judy Camp Sauer, who received her BA in Biology in 1964. This state-of-the-art facility will allow our researchers to study cellular machinery at high resolution, accelerating our understanding of disease processes and the development of new therapies.

Stengl Lost Pines Biological Station Additions

Our field station in Bastrop County, part of the Biodiversity Center, has been upgraded with three new cabins (1,300 square foot each) and a new maintenance building (1,800 square foot). The new cabins will each sleep eight and will allow overnight and long-term stays by student groups and researchers. In addition, users now have access to the 2016 acquisition of an adjacent 373 acres of different habitats, providing a total research area of 581 acres. Both the property expansion and the facilities construction were made possible by generous donations from Dr. Casey Stengl, a long-term benefactor of the UT field stations. Until now, use of the field station was constrained by a lack of accommodations. The new facilities will substantially enhance opportunities for field studies of ecology and the environment, both of which are areas of current societal concern and interest.

CREATING AND COMMUNICATING IMPACT

AT A GLANCE

2
Reimagine Education Awards for the Freshman Research Initiative

2,925 Alumni
gave 3,513 gifts in 2016–2017

>80
media accounts per month on average featured CNS experts

52
submissions for annual Visualizing Science contest

Freshman Research Initiative

The College of Natural Sciences' signature program, the Freshman Research Initiative, puts first- and second-year undergraduates into faculty-led labs to work on real research projects. This year, the FRI surpassed a milestone, as more than 200 papers have now been published in peer-reviewed journals that were authored in part by FRI students. Additionally, FRI participants were coauthors on a Best Paper Award-winner at an international computer science conference, the Genetic and Evolutionary Computation Conference in July.

FRI itself received a Gold Award for STEM education and a Silver Award winner for Presence Learning in a worldwide competition sometimes billed as "the Oscars of Higher Education." The 2016 Reimagine Education Awards attracted more than 800 submissions from higher education institutions in 56 countries, and FRI received distinction at the annual contest that works to identify the most effective and innovative methods for educating and preparing undergraduate students for life after college. The awards program is organized by the SEI Center for Advanced Studies in Management at the Wharton School at the University of Pennsylvania and QS Quacquarelli Symonds, which publishes the QS World University Rankings.

Engaging Alumni

The College has more than 60,000 living alumni, and more of them are making gifts to the College than at any time in the past five years. Roughly 7,000 gifts from alumni, friends, corporate, and foundation partners were made to the College of Natural Sciences in 2016–2017, totaling $33.6 million. The number of donors giving major gifts of $100,000 or more was at its highest point in five years, with 59 unique donors giving in this range.

More than 80 individuals became participants in the newly launched Dean's Discovery Circle. Members make annual contributions of between $2,000 and $20,000 to provide unrestricted financial support for strategic initiatives within the College, thus allowing for nimble investments in key areas relevant to the College's growth and improvement.

Publicizing Discoveries

Media tracking in CNS found more than 1,000 instances of UT Austin faculty, student researchers, and experts from the College of Natural Sciences appearing in published news accounts about science and educational programs. Below are some select highlights of news coverage in top outlets.

"How Tech Giants Are Devising Real Ethics for Artificial Intelligence"
New York Times
Peter Stone, Computer Science

"Chemists Re-Create Deadly Frog Poison In The Lab"
NPR
Rebecca Tarvin (graduate student), Integrative Biology

"Swarming Crazy Ants with a Penchant for Destroying Electronics Are on the Move in Texas"
Washington Post
Ed LeBrun, Integrative Biology

"When Grown-Ups Party at the Children's Museum"
Wall Street Journal
Women in Natural Sciences, College of Natural Sciences

"When an Animal's Sex Is Set by a Microbe"
The Atlantic
Nancy Moran, Integrative Biology

"Giant Star Betelgeuse May Have Devoured Sun-Size Companion"
Fox News
Craig Wheeler, Astronomy

"We Always Knew Our Ancestors Were Microbes. Now We Found Them."
Washington Post
Brett Baker, Marine Science

"Impossible' State of Matter Made of 'Time Crystals' Has Been Created in a Lab"
Wired
Andrew Potter, Physics

"Can Old Prescription Drugs Provide New Treatments for Alcoholism?"
The Atlantic
Adron Harris, Neuroscience

"Astronomers Take a Step Closer to Proving Event Horizons Around Black Holes Do Exist"
Wired
Pawan Kumar and Wenbin Lu (graduate student), Astronomy

"Quantum Computing Might Be Here Sooner Than You Think"
Bloomberg
Scott Aaronson, Computer Science

"How Frogs Benefited From The Dinosaurs' Extinction"
NPR
David Hillis, Integrative Biology

"Bees Under the Macro Lens – In Pictures"
The Guardian
Alejandro Santillana (undergraduate student), Integrative Biology

"Rogue 'Double Planet' is Actually 2 Failed Stars"
Fox News
Trent Dupuy, Astronomy

"How to Thrive in an Empty Nest"
New York Times
Karen Fingerman, Human Development and Family Sciences

"Fire Ants Are Yet Another Hazard in Houston's Flooded Streets"
New York Times
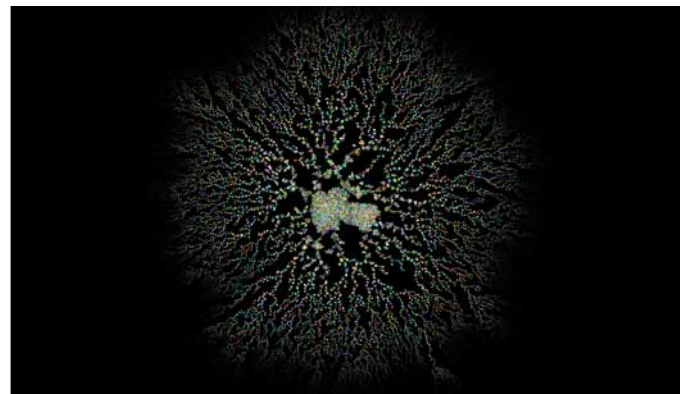Larry Gilbert, Integrative Biology

Visualizing Science

More than 100 scientific images were submitted to the College's Visualizing Science contest, and winning images were displayed prominently in buildings around the UT campus.
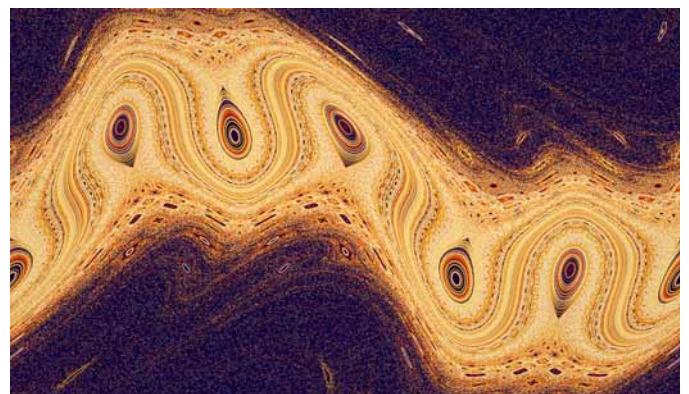
Michael Allshouse
Postdoctoral Researcher
Physics
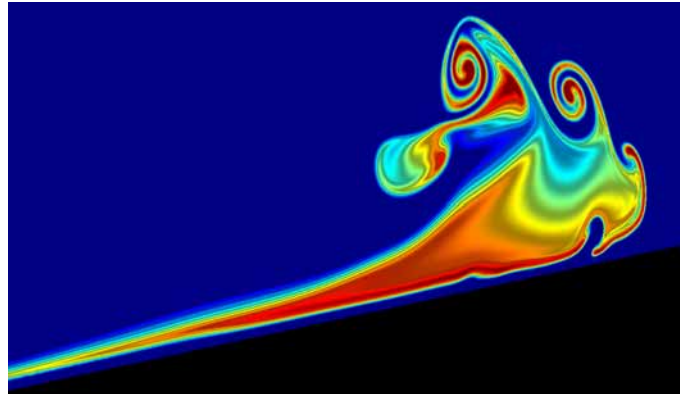
Claire McWhite
Graduate Student
Cell and Molecular Biology

George Miloshevich
Graduate Student
Physics

Coyne Gibson
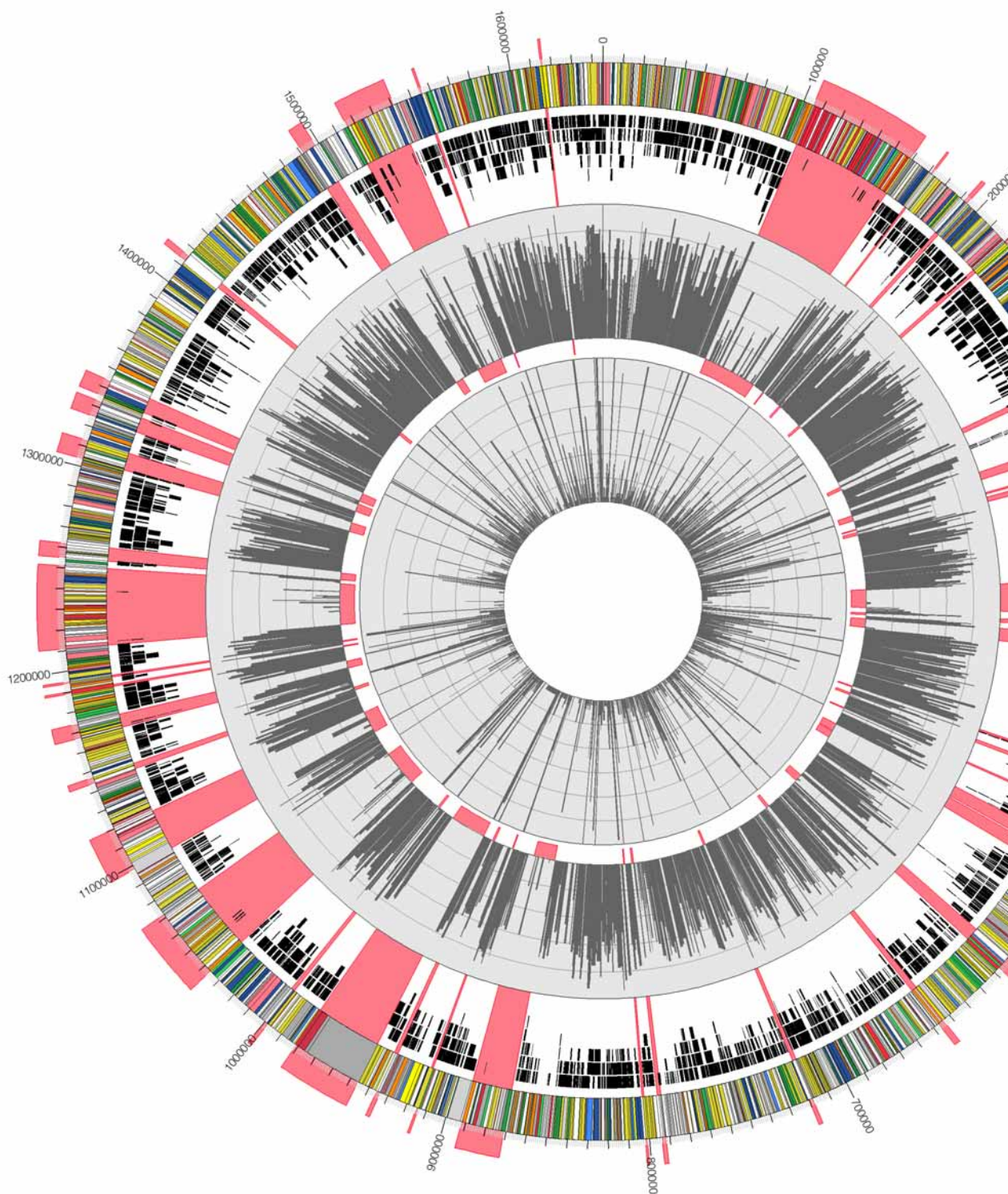Manager of Observing Support
McDonald Observatory

Elise LeBovidge
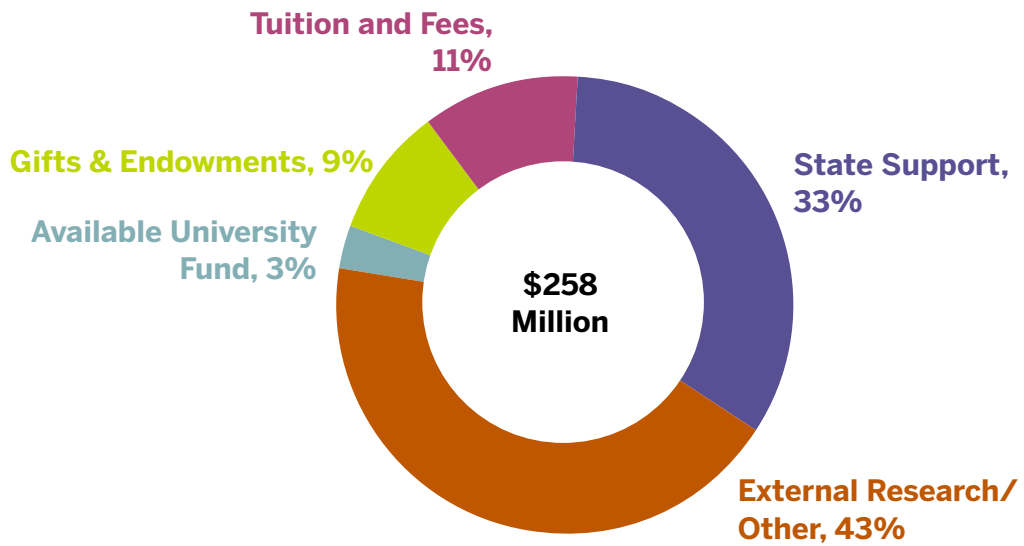Undergraduate Student
Chemistry
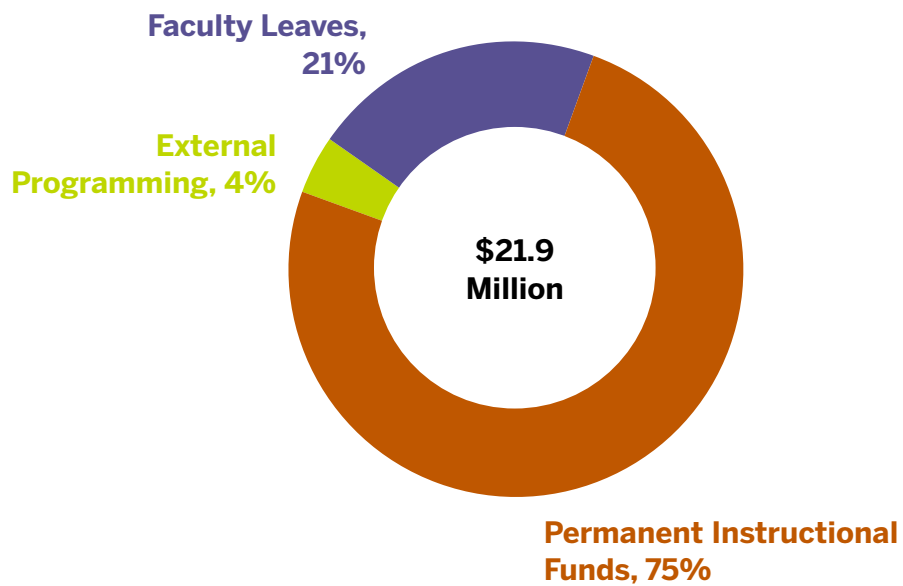

Corinne Burns
Graduate Student
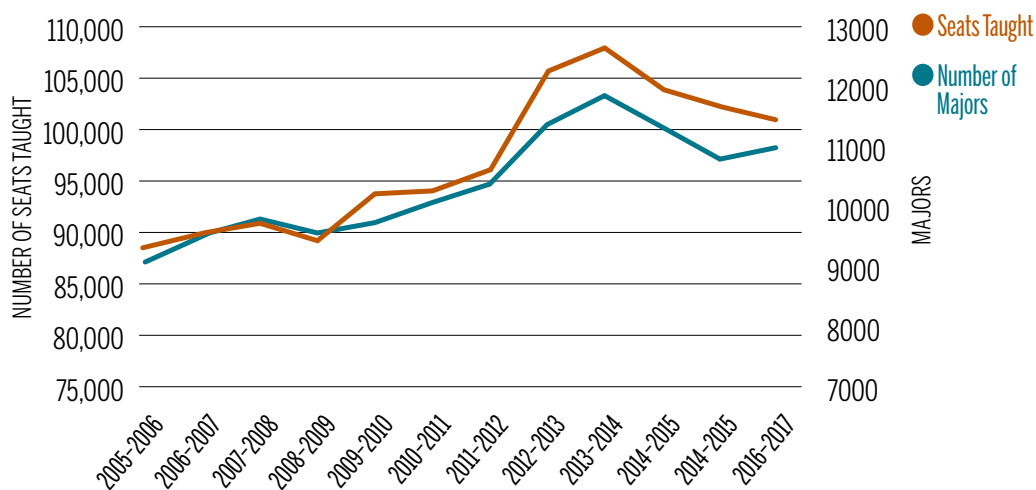Marine Science

COLLEGE BUDGET, ENROLLMENT AND FUNDRAISING

2016–2017 Budget

Tuition and Fees, 11%

Gifts & Endowments, 9%

Available University Fund, 3%

State Support, 33%

$258 Million

External Research/ Other, 43%

2016–2017 Instructional Budget

Faculty Leaves, 21%

External Programming, 4%
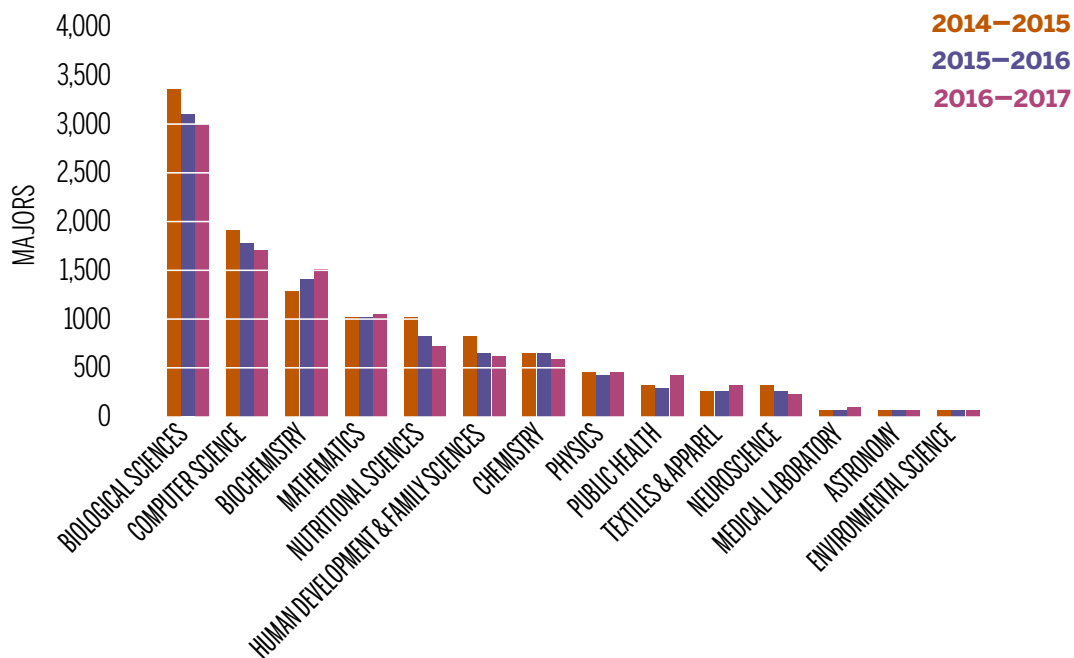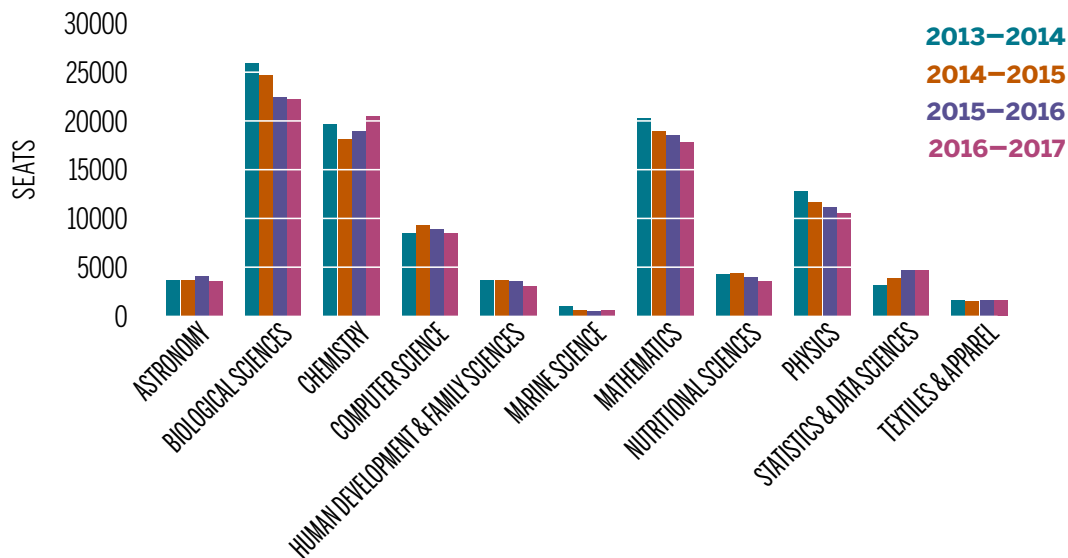
$21.9 Million

Permanent Instructional Funds, 75%

Change in CNS Majors and Number of Seats Taught

Number of CNS Majors (3-Year History)
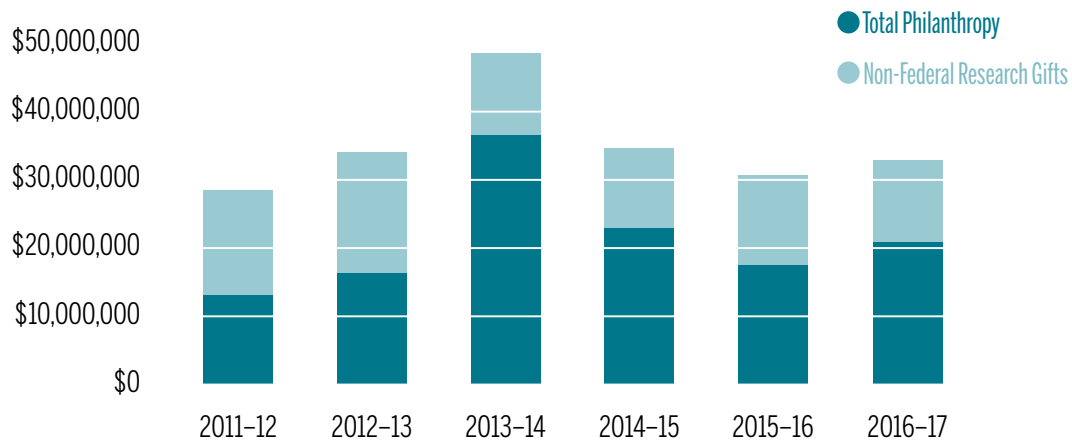
Seats Taught by Department (4-Year History)

Legend:
- 2013–2014
- 2014–2015
- 2015–2016
- 2016–2017

Y-axis: SEATS (0 to 30000)

Departments: ASTRONOMY, BIOLOGICAL SCIENCES, CHEMISTRY, COMPUTER SCIENCE, HUMAN DEVELOPMENT & FAMILY SCIENCES, MARINE SCIENCE, MATHEMATICS, NUTRITIONAL SCIENCES, PHYSICS, STATISTICS & DATA SCIENCES, TEXTILES & APPAREL

CNS Graduate Program Enrollment (4-Year History)

Legend:
- 2013–2014
- 2014–2015
- 2015–2016
- 2016–2017

Y-axis: STUDENTS (0 to 300)

Departments: ASTRONOMY, BIOCHEMISTRY, CELL AND MOLECULAR BIOLOGY, CHEMISTRY, COMPUTER SCIENCE, ECOLOGY, EVOLUTION AND BEHAVIOR, HUMAN DEVELOPMENT & FAMILY SCIENCES, MARINE SCIENCE, MATHEMATICS, MICROBIOLOGY, NEUROSCIENCE, NUTRITIONAL SCIENCES, PHYSICS, PLANT BIOLOGY, STATISTICS & DATA SCIENCES
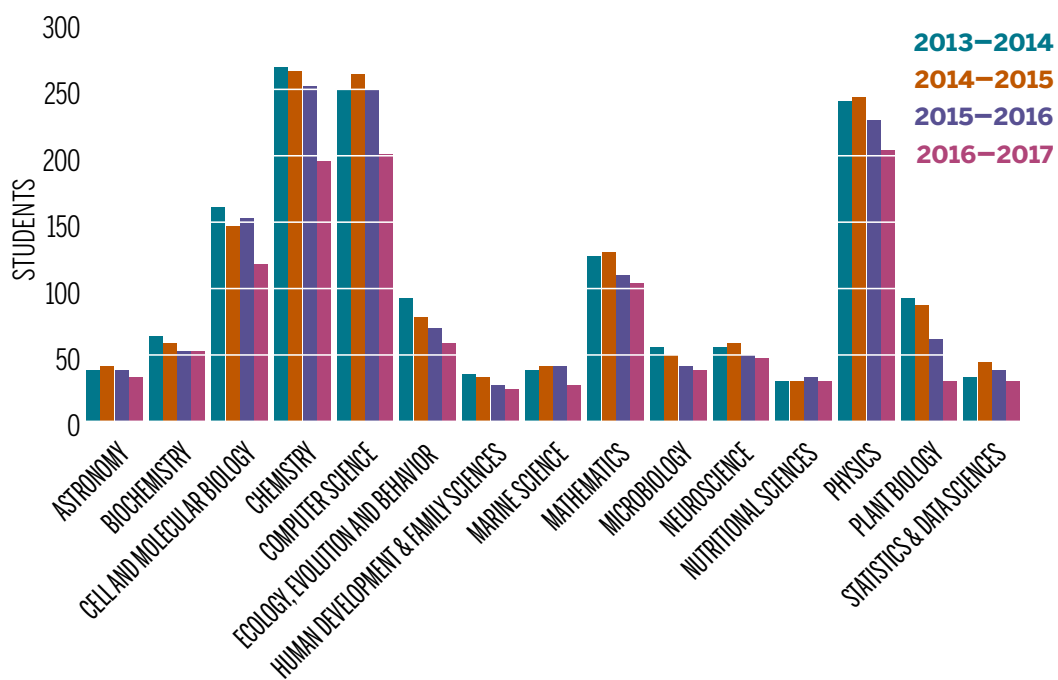
FUNDRAISING RESULTS

Annual Philanthropic Gifts

Legend:
- Total Philanthropy
- Non-Federal Research Gifts

(Chart axis values: $0, $10,000,000, $20,000,000, $30,000,000, $40,000,000, $50,000,000)

Years: 2011–12, 2012–13, 2013–14, 2014–15, 2015–16, 2016–17

Unique Donors to the College

DONORS

(Chart axis values: 0, 1,000, 2,000, 3,000, 4,000, 5,000, 6,000)

Years: 2012–13, 2013–14, 2014–15, 2015–16, 2016–17