

# CAROLINA *Chronicle*

THE GRADUATE SCHOOL

2017



*GRADUATE STUDENTS*

**BUILD INNOVATION**

**Every day**, graduate students at the University of North Carolina at Chapel Hill are hard at work on meaningful research projects. The *Carolina Chronicle* highlights the impact of graduate students on campus, in the state and worldwide. Within this issue are compelling stories of curiosity and commitment.

Graduate students make significant contributions to our University's research enterprise, and teaching and service missions. More than 1,300 international graduate students bring global perspectives to research, teaching and community outreach at Carolina. In fact, Zeliha Kilic, from Turkey, recently won a 2017 Tanner Award for Excellence in Undergraduate Teaching by Graduate Teaching Assistants. Read on to learn about Zeliha and several other international students at Carolina, and find out how graduate students are bringing their research to life in Be A Maker spaces on campus.

You can access [carolinachronicle.unc.edu](http://carolinachronicle.unc.edu) for more exciting content, including infographics and videos. The website has stories on engaged research and the connections between community stewardship and Carolina scholarship. You can also find stories of Graduate Education Advancement Board (GEAB) Impact Award winners, whose research is helping to solve challenges within North Carolina. New this year, the Horizon Awards recognize promising research with potential future benefits, such as "smart" insulin patches to manage diabetes.

We love to stay in touch with graduate students and alumni. Please let us know where your path from Carolina has taken you: Send comments and suggestions to [carolinachronicle@unc.edu](mailto:carolinachronicle@unc.edu).

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*Cover photo:* Matt Boyce in the Murray Hall makerspace. *Back cover photo:* A detail from the Kenan Science Library makerspace.

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The *Carolina Chronicle* is produced exclusively with private funding.

**16** graduate students and  
**36** postdoctoral fellows

have passed through Vice

Chancellor for Research

Terry Magnuson's lab since

his arrival at Carolina

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**3** makerspace  
sites on campus

**1,303** international  
graduate students on  
campus as of fall 2016

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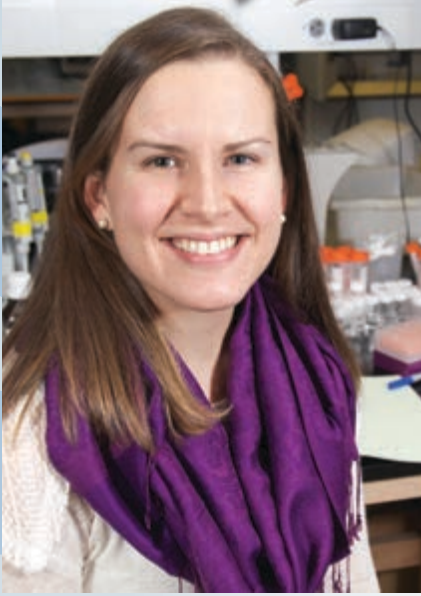


**690** doctoral students  
have been Royster Fellows  
during the program's first  
20 years

1303

690





**Learn more** about heart risk factors for farmworkers, Catawba Nation history, urban forests, the effectiveness of public housing work requirements, algorithms that may support more accurate cancer diagnoses and more. Graduate students and recent graduate alumni received 2017 **GEAB Impact Awards** and—new for this year—**Horizon Awards** for their discoveries.



Photo by Kerry Irish

# carolinachronicle.unc.edu

for more stories and interactive content

**Watch a video** on how Jessica Soldavini, a UNC doctoral student in nutrition, is working with Chapel Hill Mayor Pam Hemminger to provide meals for children in need in Chapel Hill and Carrboro.



**"The students ... got to see that their community cared about them."**

—Chapel Hill Mayor Pam Hemminger, speaking about the program "Food for the Summer"



Photo by Carol Bono



**Watch a video** on how Pavithra Vasudevan, a UNC doctoral student in geography, is working

**"It was an opportunity for the people in West Badin to ... have a better understanding of why the community members were concerned ..."**

—Community organizer Naeema Muhammad, speaking about "Race and Waste in an Aluminum Town"

with community organizer Naeema Muhammad on the collaborative research project "Race and Waste in an Aluminum Town."

Photo by Carol Bono





# Making Science EXCITING

By Lauren Haller

## New UNC vice chancellor for research loves when graduate students challenge his ideas

**A**ccording to Terry Magnuson, Ph.D., science is difficult—but graduate students make it fun. Magnuson, the new vice chancellor for research at the University of North Carolina at Chapel Hill, says the most enjoyable part of conducting science is working with graduate students and postdoctoral fellows.

He explains that graduate students have always been an invaluable component of his research team. He enjoys the student-mentor relationship, and welcomes fresh ideas and research contributions from students.

“They’re excited, they’re passionate, they like what they’re doing, and that’s what makes our work fun,” Magnuson says. “Doing science is not easy. Ninety percent of what you do doesn’t work. You have to come back and approach it again. So

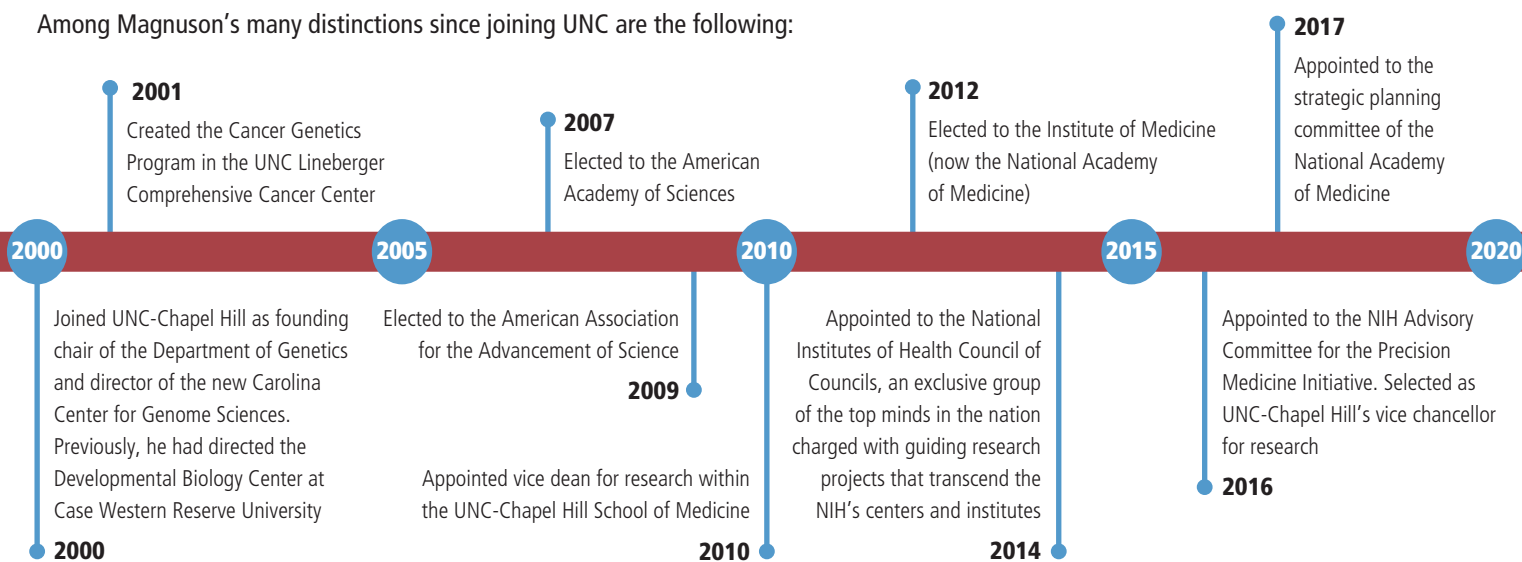
having graduate students and postdocs around me, that’s what makes doing the work pleasurable.”

When Magnuson was recruited to UNC-Chapel Hill in 2000, the distinguished mammalian geneticist brought his 15-member laboratory team—including four graduate students—and 10,000 mice along with him.

Initially, Magnuson served as the founding chair of the Department of Genetics and first director of the Carolina Center for Genome Sciences. Among many other accomplishments, he has since created the Cancer Genetics Program and was elected to the American Academy of Sciences, the American Association for the Advancement of Science and the National Academy of Medicine.

# Terry Magnuson *at Carolina*

Among Magnuson's many distinctions since joining UNC are the following:



Magnuson is enthusiastic about connecting various science disciplines and integrating research across the entire university, which he refers to as research convergence. He says graduate students are the key to these connections and to solving the challenging research questions of the world.

"Graduate students are the ones who go out to find out who is doing what, and how their work can move a project along," he says. "They are the ones who bring labs in disparate fields together, which is how you answer very challenging questions."

Magnuson points out that pharmaceutical and biotechnology industries look to universities to see what research has potential, and depend on the talent that comes from universities such as UNC-Chapel Hill.

Noting that many science careers outside of academia require graduate education, Magnuson also emphasizes the importance of professional training, internships in industry and programs such as the Professional Science Master's degrees.

"I think The Graduate School does an outstanding job highlighting and holding workshops for graduate students on the various career paths open and available to them," he says.

Magnuson and the Office of the Vice Chancellor for Research

are committed to providing the necessary research environment and technology for research, and most importantly, to making cross-departmental connections. He says that his office works closely with The Graduate School to ensure a wide range of training and credentialing opportunities for students.

"Our office is focusing on grand challenges and ideas, and then collecting the appropriate groups of people to get started," he says. "I believe that puts graduate students in a great position for exciting research opportunities."

A total of 16 graduate students and 36 postdoctoral fellows have passed through Magnuson's lab since his arrival at Carolina. The dynamic between Magnuson and students is a shared learning experience, and he says he learns from his students all the time.

"The thing I love the most is when they challenge my ideas," he says,

recalling a time when he told a graduate student to go back to the lab and try again. "I made him go back four or five times until he finally convinced me with all of the data. It led to a completely new discovery that changed the direction of the lab and opened a new field of science. And that's what you like to see."

*"Doing science is not easy. Ninety percent of what you do doesn't work. You have to come back and approach it again. So having graduate students and postdocs around me, that's what makes doing the work pleasurable."*





# BUILDING INNOVATION

## Students bring art, humanities and science projects to life

By Christine Scalora

Whether they are creating 3-D models of tumors, printing wearable technology, or reconstructing history, University of North Carolina at Chapel Hill graduate students are bringing unique research projects to life.

Their creativity and innovative new campus makerspaces are making these and other projects possible.

Richard Superfine, Ph.D., Taylor-Williams Distinguished Professor in the Department of Physics and Astronomy, directs the Be A Maker (BeAM) network at UNC-Chapel Hill. There are currently three makerspace sites on campus: in Murray Hall, in the Hanes Art Center and in Kenan Science Library. The spaces include tools such as drill presses, laser cutters, sewing machines and 3-D printers. All makerspaces are available to faculty, staff and students.

Superfine says the creation of physical objects is often part of conceptualizing ideas. He adds that the most powerful aspect of BeAM is that it creates and empowers a community of makers on campus. “By coming to the space, you are going to meet makers from across the campus—who are in other disciplines, who bring other expertise.”

This collaborative approach to problems will have a deep impact on the execution of science and research, Superfine says.

### 3 Things BeAM wants for grad students

The BeAM makerspaces are open to all students, staff and faculty, but there are some specific things BeAM Director Richard Superfine hopes the spaces accomplish for graduate students.

1. Teach students skills—from electronics to plumbing
2. Provide comprehensive and sophisticated fabrication instrumentation
3. Create and empower a community of makers



**Matt Boyce**, who is studying analytical chemistry, uses 3-D printers and laser cutters to make flow cells and fluidic devices. Boyce, a fourth-year doctoral student, works as a graduate research assistant in the Lockett laboratory. His research is focused on developing a better 3-D tumor model using paper-based cultures.

The system uses cells suspended across porous sheets of paper to form a tissue-like construct that resembles and acts like a tumor, he says. Boyce says the lab wouldn't have attempted integrating fluidic devices and paper cultures without access to the BeAM network.

"That's the beauty of having a makerspace, because it really opens up new avenues of research that were previously closed off due to a lack of available tools," Boyce says.

Before he learned about the makerspaces, Boyce focused most of his research on using resources and systems that were already available to him. Now, he's more adventurous with his research. "It's empowering to have an outlet that I can use throughout my education at UNC to build whatever I need, whenever I need it," Boyce says.

**Kimberly English**, a first-year master of fine arts student, uses the makerspaces to research textiles that connect technology to wearable items. These smart textiles, she says, include garments that respond to the wearer or the environment.

English is interested in the history and future of textiles. In particular, she is invested in environmental, social and financial enhancements to the textile industry. In addition to working in the makerspaces, English is interviewing people in the area about the history and economic development of the textiles industry.

English says her work at the makerspaces has allowed her to be creative in a way that is different from weaving, knitting or embroidering.

"It's been kind of a magical experience working with the 3-D printers—thinking up an object, modeling it, and then in a few hours holding it in your hand," English says. "That's been my favorite part, feeling like almost anything is possible to create."

**Brad Erickson**, a fourth-year doctoral student in religious studies, is using the BeAM sites to bring history to life.

Erickson is an archeologist and his research deals with the creation of virtual ancient spaces. "In the summers I work on excavations in Israel, and I am always thinking of ways we can better visualize the past."

Recently, he's been creating 3-D visualizations of ancient synagogues within virtual environments. This way, someone can wear a virtual reality headset and experience some of the ancient world through its architecture. Erickson has been using the 3-D printer to print a series of ancient oil lamps, with the hope of having full glass replicas made, in order to understand the lighting in an ancient synagogue.

"Before I became involved with the makerspaces on campus, I had no experience with emerging consumer technologies such as 3-D printing and laser scanning," Erickson says. "Every single person I have come in contact with through the makerspaces has enriched my education and further connected me with a hybridized world of humanities and technology."





# GLOBAL SCHOLARS

## International Students Leave Large Heel Prints on Campus

By Christine Scalora

**W**hen Sertanya Reddy moved to the United States, she only knew one person. Starting a Ph.D. program at the same time as moving to a new country was challenging.

Reddy, originally from South Africa, says it can be difficult to form a community of support in graduate school because students tend to interact mostly with others in their disciplinary silos. That's why she created an initiative to support international graduate students across the UNC-Chapel Hill campus.

"As an international student and as a graduate student, if you're not intentional about building community, it can be challenging to feel connected to the campus community," she

says.

In the 2015-2016 academic year, Reddy worked as the international student advocate for the Graduate and Professional Student Federation, where she launched Global Grads. In fall 2016, Global Grads was integrated into The Graduate School's Diversity and Student Success program.

The Global Grads initiative offers professional development guidance, networking opportunities and community-building events. These programmatic offerings provide international graduate students with the chance to create support structures with other students. The Graduate School also offers the Preparing International Teaching Assistants Program (PITAP) to help students develop teaching skills and build cross-cultural communication skills.

In fall 2016, there were 1,303 international graduate students on campus. Some students are funded through research or teaching assistantships, while others are funded by governments in their home countries. These students bring their experiences and perspectives into classrooms of undergraduates who may not have studied abroad. International scholars work on a variety of research projects that have an impact in North Carolina and beyond.

Reddy says she loves the community she has developed with other graduate students—both in her department and across the campus. Through her work with Global Grads, she has witnessed the power of community and the positive difference that can make in the lives of international graduate students, as well as in their academic success while at UNC-Chapel Hill.

"I'm very grateful to The Graduate School for offering the formal institutional support to keep Global Grads going for future international graduate students."

Meet five international graduate students who are making a



**SERTANYA REDDY** *Geography*





**ANUSHA HARIHARAN** *Anthropology*

**Anusha Hariharan**, from India, primarily works with a collective of Dalit feminist activists in southern India. “The Dalits are the former ‘untouchable’ castes,” Hariharan says, “and have the lowest status in the caste hierarchy.”

“I work with them to both historicize the kind of activist work that they’ve done and come up with archival products to tell a history that goes against the grain of the nation state’s history,” she explains.

Hariharan spent the summer of 2016 in India working with the activists. The Department of Anthropology has a focus on collaborative work and part of her work was conceptualized with the activists, she says. The archive will have visual material and oral material, and it may have an online presence as well.

“Especially for people doing research on social justice or activism, these are very important findings for the community that you’re working with,” she says.

Hariharan is a teaching assistant, and her work for the Local Cultures/Global Forces course involved weekly recitations and directing mini-ethnographies for her students. Hariharan says students studied a local phenomenon that had global links. They collected ethnographic data to support their claims and performed an anthropological analysis.

“Given that I work on post-colonialism, identity politics and social movements, this was also integral in my training as a potential instructor a few years from now,” she says. “I am very thankful to my department for this opportunity.”

**Francesca Bernardi**, from Italy, studies fluid dynamics in the Joint Applied Mathematics and Marine Sciences Fluids Lab. Imagine a tube with some fluid flow in which another fluid is injected. As the fluids combine, researchers try to predict what happens as the fluid mix evolves—that’s one of the things fluid dynamics is focused on understanding.

“Being able to control the way that your chemical is delivered is very important in applications such as chemistry and the medical field,” Bernardi says.

Bernardi’s contributions aren’t limited to the lab. In addition to her research, she and a fellow student hosted Girls Talk Math, a day camp for local high school girls interested in math.

“I am very interested in the problem of the under-

representation of women in STEM [science, technology, engineering and math] and math, specifically,” she says.

Last summer, 26 students attended the camp, which is expanding in 2017.

As an undergraduate student, Bernardi only took classes in math and science. At UNC-Chapel Hill, she has taken advantage of the opportunity to take classes in other departments. Bernardi is pursuing the Graduate Certificate in Women’s and Gender Studies. She also took two of the PITAP classes offered by The Graduate School on teaching for international students, which she says were very helpful.

Bernardi has served as a teaching assistant for a variety of math classes and has served as the instructor of record for a few classes, as well.



**FRANCESCA BERNARDI** *Mathematics*



**ANDREA OTERO** *Economics*

**Andrea Otero** decided she wanted to study economics when she was about 15 years old. She wants to think about the ways that government can improve the lives of people.

Otero, from Colombia, was working at the Central Bank of Colombia before coming to UNC. She brings her experiences of growing up in a country with a developing economy to her classes. Otero also has work experience handling data and seeing the real-life issues that come with research and data.

Otero studies applied microeconomics and she is particularly focused on labor markets.

For her dissertation, she is using Russia as a case study and wants to create a general framework to look

at other countries, including Colombia. Otero’s end goal is to have a policy recommendation.

She is working on a new initiative in the Department of Economics called Women in Economics at UNC. It’s a group in which female students can build community and develop tools to fight some of the disparities that still exist in the labor market for economists.

Otero says she has enjoyed moving to Chapel Hill, which has a lot of young people. She is part of the Global Grads student advisory board, and enjoys helping international students “feel at home while studying at UNC.”

“I’ve made new friends through Global Grads, especially the other members of the board,” she says. “I also encourage my friends to go to these meetings.”

When **Zeliha Kilic** was studying in her home country of Turkey, she was focused on algebra. When she came to UNC-Chapel Hill, she discovered the Joint Applied Mathematics and Marine Sciences Fluids Lab and took classes from the principal investigators of the lab. Now, Kilic researches fluid dynamics.

After graduating, Kilic wants to stay in academia in a position that balances teaching and research.

"Teaching is good for community," she says. Kilic received a 2017 Tanner Award for Excellence in Undergraduate Teaching by Graduate Teaching Assistants.

At UNC-Chapel Hill, Kilic has taught algebra for non-science majors. These students may not initially be very interested in math, she says, so she tries to push them to participate in group activities so they don't feel alone.

"I'm trying to make it so they are not going to feel lost," Kilic explains.

Kilic's family lives in Istanbul, which has a population of 14 million people. Adjusting to Chapel Hill was hard, she says. But Kilic found a host family and celebrated Christmas with them.

She was inspired to apply to UNC-Chapel Hill because a mathematician she admires, Arzu Boysal, also studied at the university.

"She makes up all these beautiful theorems," Kilic added. "If this happened to her, it has got to be happening to me in the end."

Kilic is also grateful for the support she has received from Aziz Sancar, Nobel laureate and Sarah Graham Kenan Professor of Biochemistry and Biophysics at UNC-Chapel Hill.



**ZELIHA KILIC** Mathematics



**FREDY R. GREFA** Geography

**Fredy R. Grefa** is a member of the Napo Runa people of the Ecuadorian Amazon. After receiving his master's degree in city and regional planning from UNC-Chapel Hill, Grefa returned to Ecuador to work in a research park.

Grefa wanted his career to support his people in the Ecuadorian Amazon, so he returned to UNC to pursue his doctorate. Senescyt, the National Secretariat for Higher Education, Sciences, Technology & Innovation of Ecuador, is funding his education.

"I feel very fortunate to be at this university, because I am working with very excellent scholars," Grefa says. "I think the university itself gives me the opportunity to interact with different views and to have conversations about global ideas and to have the conversation from the indigenous peoples' view in this academic environment."

Grefa's research focuses on payment for ecosystem services, a new conservation initiative that provides

financial or other support to indigenous peoples to protect natural resources. The challenge is complex, and his research combines geographic, ecological, political, philosophical and community issues, as well as an understanding of the natural world. "Nature is considered our home, our kin, our relative," he says.

Grefa wants to return to Ecuador and share his knowledge with the indigenous people at the heart of these issues. He hopes to work within an Ecuadorian university, "especially doing research with and for indigenous communities." With his doctorate, Grefa explains, he can serve as a bridge between academic and non-academic communities in the Amazon region.

"I don't want to be selfish just getting knowledge for myself, but for all these Ecuadorians or indigenous people to promote indigenous rights and to rebuild a new society which promotes a new form of social coexistence, in diversity and in harmony with nature."

Videos and more information for global students:

[gradschool.unc.edu/globalwelcome](https://gradschool.unc.edu/globalwelcome)  
[gradschool.unc.edu/globalgrads](https://gradschool.unc.edu/globalgrads)



# MAKING A DIFFERENCE



The **GRADUATE EDUCATION ADVANCEMENT BOARD** (GEAB) supports The Graduate School and University of North Carolina at Chapel Hill in many ways. Members provide advocacy for graduate education and generate funds that support graduate students' academic needs. GEAB members provide their own financial support to the GEAB Impact Awards (honoring graduate student research of direct benefit to North Carolina), fellowships and other areas benefiting students.

**GEAB members pictured above:** (front row, left to right) Howard Lee, Penny Aldrich, Verla Insko, Fran Hoch and Burnet Tucker; and (back row, left to right) Don Buckley, Drusilla Scott, Ivy Carroll, Paul Hoch, Beth Whitaker, David Lewis, Ken Smith (chair of the GEAB) and Andrew McMillan Jr.

Photo by Will Owens

## *Graduate Education Advancement Board Members*

|                      |                 |                     |                              |
|----------------------|-----------------|---------------------|------------------------------|
| Penny Aldrich        | Harold Glass    | David Lewis         | Thomas Sox                   |
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| Donald Buckley       | Michael Harpold | Andrew McMillan Jr. | Beth Whitaker                |
| Ivy Carroll          | Fran Hoch       | David McNelis       | <b>GEAB Members Emeritus</b> |
| Debashish Chatterjee | Paul Hoch       | Laurie Sanford      | Timothy Crowder              |
| Lana Dial            | Verla Insko     | Drusilla Scott      | Peace Sullivan               |
| Linda Dykstra        | Blair Kutrow    | Kenneth Smith       | Priscilla Taylor             |
| David Edwards        | Howard Lee      | Carol Smithwick     | Charles Weiss                |



**In memoriam:** The Graduate School administration and staff extend their sympathies to the families of M. Ross Johnson, pictured at left, and Lyle Jones, pictured at right. Both Dr. Johnson and Dr. Jones passed away in 2016. Dr. Johnson, a longtime member of The Graduate School's Graduate Education Advancement Board, passed away on October 17, 2016. He was a recognized leader in medicinal chemistry and a generous supporter of the University of North Carolina at Chapel Hill. Among their areas of University support, Dr. Johnson and his wife, Charlotte, endowed a dissertation fellowship within

The Graduate School's Royster Society of Fellows. Since 2001, 16 doctoral students have received the Ross and Charlotte Johnson Family Dissertation Fellowship. Dr. Jones, vice chancellor and dean of The Graduate School from 1969 to 1979, passed away on April 13, 2016. During his tenure as dean, Dr. Jones was a tireless supporter of graduate education's important contributions to North Carolina and to the UNC-Chapel Hill campus. He worked to recruit minority graduate students who were underrepresented in graduate education and collaborated



# ROYSTER 20<sup>th</sup> ANNIVERSARY-

## BY

The Graduate School celebrated the Royster Society of Fellows' 20<sup>th</sup> Anniversary on Sept. 30 and Oct. 1, 2016, with a special reception and dinner honoring Mrs. Thomas Royster. The fellows and alumni also attended a welcome reception, as well as professional development opportunities organized by the fellows.

Chancellor Emeritus Paul Hardin met with Mrs. Royster before the reception. More than 230 Royster fellows and alumni and friends of graduate education attended the dinner. In 20 years, 690 doctoral students from 62 academic programs have served as Royster Fellows.

Speakers during the dinner included Steve Matson, dean of The Graduate School; Linda A. Dykstra, former dean of The Graduate School; Marsha Collins, the Caroline H. and Thomas S. Royster Distinguished Professor for Graduate Education; Douglas Shadle, Royster alumnus and assistant professor of musicology at Vanderbilt University; and Madelyn Percy, Royster fellow and doctoral student in geological sciences. All shared gratitude, from different perspectives, for the Roysters and their extraordinary commitment to graduate students at Carolina. Mrs. Royster gave remarks and received a standing ovation.

Carol and Edward Smithwick were also honored for the dissertation fellowship they endowed within the Royster Society. The Johnson family (the Ross and Charlotte Johnson Family Dissertation Fellowship) was also recognized for its endowment.





# The Graduate School

## HONOR ROLL OF GIVING

Fiscal Years 2016 and 2017 as of 02.03.17

### Dean's Club

\$1,000 or more

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|                                      |                                       |                                 |                                     |                                   |
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\$100-\$499

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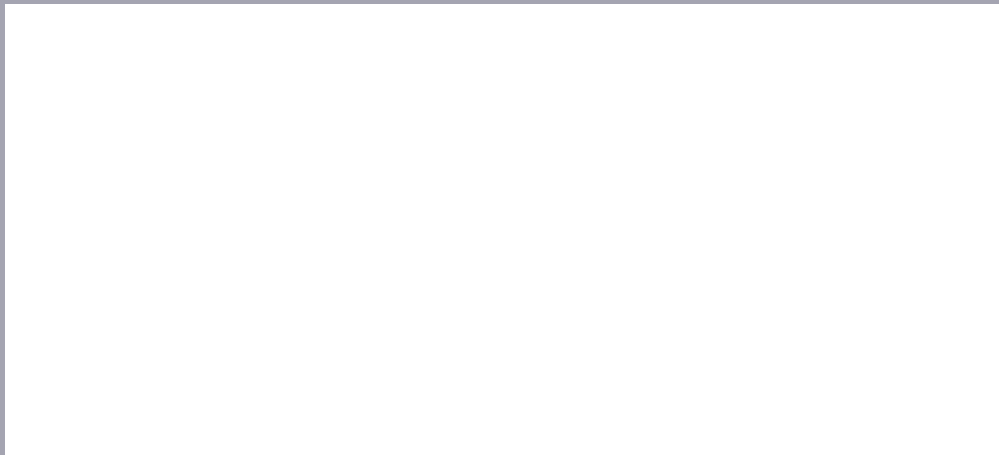
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