THINK AND DO.

NC STATE UNIVERSITY
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Welcome

The NC State Investment Fund (Fund) is committed to the responsible stewardship of its resources to assist the University in a commitment to excellence in a comprehensive range of disciplines. Growing the endowment remains a top priority for the University, and I am pleased to report that as we closed fiscal year 2019, the Fund achieved top-quartile performance relative to other endowments, returning 7.3 percent for the fiscal year ending June 30, 2019. This exceptional return in a challenging year, coupled with gift receipts, helped to raise the University’s Total Endowment to a historical high of $1.401 billion (compared with $1.297 billion on June 30, 2018), or an increase of $104 million. The NC State community provided generous philanthropic support, with $35.9 million in long-term gifts to the Fund for the year.

While recent investment market performance generates media headlines, the NC State Investment Fund is more concerned about long term performance. The Fund’s three, and five year average annual returns of 10.3%, and 7.6% as of June 30, 2019 place it in the top-quartile relative to other university endowments. The 9.4% percent average annual return over the 10 years ended June 30, 2019 was generated with 64% percent less volatility than the S&P 500 Index and 66% less volatility than the MSCI All Country World Index.

As a research-extensive land-grant university, NC State University’s vision is to be an institution recognized around the globe for its innovative education and research. Since inception, the Fund has supported funding toward this vision, with $313 million awarded in scholarships, fellowships, and professorships. Together with the Think and Do campaign, the Fund is positioned to provide vital support to advance our participants’ strategic initiatives, including attracting the most talented faculty and most promising students.

The 2019 fiscal year was one characterized by volatility and the end stage of a long economic recovery; however, we also recognize that trying to predict “when” and the “where” for a market correction is a recipe for failure and beyond our abilities. Instead, we maintain a long-term focus, investing with best-in-class managers across a diversified mix of strategies.

Within this context, philanthropy will always be important. As the University continues its “Think and Do the Extraordinary” Campaign, we are grateful for the tremendous support of the donors and participants of the Fund.

Mary Peloquin-Dodd
Treasurer, NC State Investment Fund
Introduction to the NC State Investment Fund, Inc.

The NC State Investment Fund, Inc. (Fund) is a governmental not-for-profit organization established in 1998 which began operations in April 1999 as a separately incorporated external investment pool for the University’s Endowment Fund and other university-associated entities’ endowed funds. This annual report covers the original pool, the long-term investment pool.

The goal of the Fund is to provide a real total return from endowed assets invested that will preserve the purchasing power of Fund capital, while generating an income stream to support the spending needs of the University. Achievement of the real total return will be driven by an investment strategy that provides an opportunity for superior total returns within acceptable levels of risk and volatility. A long-term investment horizon has been adopted such that the risk and duration of investment losses are carefully weighed against the long term potential for appreciation of assets.

Investment Objectives

The primary investment objective of the Fund is to preserve real purchasing power over the long term of the endowment while providing predictable, stable and constant (in real terms) funding for the participating entities by earning an average annual rate of return, net of all management costs and fees, at least equal to its reasonable spending needs plus inflation.

Long-term Investment Objectives

1. Preserve the real purchasing power of the Fund’s assets, while providing a predictable, stable, and constant (in real terms) stream of distributions for operational support.

2. Earn an average annual real total return of at least 5.5% per year, net of all fees, including management advisory fees and custody charges, over rolling five- and ten-year periods.

3. Earn a rate of return, net of all fees, that exceeds the return on a 70/30 stock/bond benchmark index comprised of 70% MSCI All Country World Index (ACWI) and 30% Barclays Aggregate Index, over rolling five- and ten-year periods.

Fund Oversight

The Fund’s oversight is provided by the Fund’s Members Board and its Board of Directors. In fiscal 2019, the Members Board was an eleven member board made up of six ex officio members of the University, the three largest participants of the Fund, and two rotating seats from the remaining participants of the Fund. Subsequent to fiscal year end 2019, the governance structure of the Fund changed to a sixteen member board allowing for all participants a seat on the Members Board. For voting purposes, where more than one participant exists to support the same University college, then all members appointed by those participants shall have a combined total of one vote.

The Members Board is responsible for the governance of the fund while the Board of Directors’ primary role is to oversee the investment aspects of the fund. A list of the Board of Directors can be found on page 6.
NC State Investment Fund
Board of Directors

The Board of Directors (Investment Committee) is responsible for implementing the investment policy and asset allocation, monitoring of investment performance and other investment decisions. These individuals were selected for their professional or personal knowledge and experience in the area of investments along with a demonstrated interest in the University and its mission. These Board members are elected for a three year term with the option to serve three consecutive terms.

Mr. Michael Lawrence
Chair, Raleigh, N.C.

Mrs. Nan G. Strader
Vice-Chair, Williamsburg, V.A.

Mr. Rob Nelson
Chapel Hill, N.C.

Mr. Dennis Gartman
Suffolk, V.A.

Mr. Clay Blue
Wallace, N.C.

Mr. Jeff Smith
Raleigh, N.C.

Mr. Craig Demko
Raleigh, N.C.

Mr. Bob Newell
Chapel Hill, N.C.

Mr. Jeff Brock
Raleigh, N.C.
Global markets experienced wild swings in fiscal year 2019 rebounding from a volatile fourth quarter 2018 with a strong first half of 2019 resulting in positive returns for most major equity and fixed income indices for the fiscal year ended June 30, 2019. The volatility in the market during the past fiscal year was driven by the United States' multi-front trade tensions and uncertainty around the country’s ability to successfully negotiate Brexit, particularly following Boris Johnson’s ascension to Prime Minister in July.

Emerging markets, as measured by the MSCI Emerging Markets Index, were also modestly positive, gaining 1.6% for the year. Within emerging markets, China has been a concern given the trade war with the United States and a slowing economy at home. Emerging markets have also been hurt by the strength of the U.S. dollar and volatile moves in oil markets.

Fiscal year 2019 saw a drop in 10-year Treasury yields following a mid-year dovish pivot by the Fed, with the benchmark rate beginning the year at 2.87% and ending at 2.0%. Long duration and credit-sensitive securities performed well during the year with the Bloomberg Barclays US Long Corporate Index producing a return of 15.2%. The more broadly diversified Bloomberg Barclays US Agg Bond Index also performed well during the year, netting a gain of 7.9%.

Looking ahead, key market factors are monetary policy and trade. With central banks reiterating their willingness to be accommodative and to address slowing economic momentum, it appears that the global growth cycle isn’t over. On the trade front, we continue to take two steps forward and one (or three) steps back, until a final resolution is found. The cautiously optimistic view of investors on trade and central bank policy has resulted in bond and equity markets sending conflicting signals on the economy with the yield curve remaining inverted while equities progress toward all-time highs.

Subsequent to fiscal year end, Christine Lagarde was appointed to succeed Mr. Draghi, with her confirmation set for October. Expectations are that Ms. Lagarde will continue down the accommodative path set by Mr. Draghi. In the United Kingdom, uncertainty remains around the country’s ability to successfully negotiate Brexit, particularly following Boris Johnson’s ascension to Prime Minister in July.

Domestic equities, as measured by the S&P 500 Index, produced strong gains for investors, returning 10.4% for the year. Mid-cap stocks, as measured by the Russell Mid Cap Index modestly lagged their larger counterparts, returning 7.8%, while small-cap stocks (Russell 2000 Index), trailed significantly, producing a -3.3% return for the same period. For the three-year period ended June 30, 2019, large-, mid-, and small-cap stocks were all positive with annualized returns of 14.2%, 12.2% and 12.3%, respectively.

International equities, as measured by the MSCI EAFE Index, lagged their domestic counterparts, returning 1.6% for the year. In the Eurozone, GDP and inflation have been low but stable, and current European Central Bank (ECB) President Mario Draghi has communicated his willingness to provide more accommodative policies.
As of June 30, 2019, the Fund had a market value of $1.07 billion, a year-over-year increase of approximately $65.1 million. The Fund has experienced considerable growth over the last ten years with its market value expanding at a compounded annual growth rate (CAGR) of 15.3%. For the last five years, the growth rate has slowed modestly, with the Fund growing at a 12.4% CAGR.

The Fund’s investment objective is to maintain the purchasing power of endowments over long-term horizons. As such, the Fund is structured to benefit from protracted market dynamics and illiquidity premiums associated with investing in private markets. As of June 30, 2019, the Fund outperformed both of its stated benchmarks over 1-, 3-, 5-, and 10-year investment horizons. The Fund’s absolute performance has been strong across those time periods with returns of 7.3%, 10.3%, 7.6% and 9.4%, respectively.

The Fund is managed as a broadly diversified portfolio with exposure to eight primary asset classes and many sub-strategies within each asset class. The Fund seeks to diversify exposure to the sub-strategies through the use of multiple investment managers that utilize a variety of investment approaches. The purpose of diversification is to provide reasonable assurance that no single security, class of securities, or investment manager has a disproportionate impact on the Fund’s aggregate results. The focus on controlling volatility preserves capital and benefits Fund participants through the power of compounding.

For FY 2019, six of the Fund’s eight primary asset classes outperformed their policy benchmarks by an average of 4.8%. Private Equity produced the strongest absolute and relative performance for the year, netting a gain of 21.5%, 12.1% ahead of its benchmark. In absolute terms, Long Biased Equity had the lowest return for the year, gaining just 2.5%, trailing its benchmark by 3.8%.

The Fund Asset Class Returns vs. Policy Benchmarks

The Strategy

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Strategic Objectives

The Fund is broadly diversified with assets allocated to achieve the return objective of inflation plus 5.5% (net of fees). Asset allocation guidelines emphasize equity-related investments to achieve the Fund’s long-term return objective.

Tactical asset allocation ranges provide flexibility to take advantage of market opportunities and reduce risks. The Fund’s actual asset allocation may temporarily fall outside of these guidelines, but only when the Board determines that deviation from the established ranges is appropriate.

Each asset class above has a defined role within the overall Fund’s asset allocation structure.

### Asset Class

<table>
<thead>
<tr>
<th>Strategic</th>
<th>Tactical</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target</td>
<td>Range</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assets</td>
<td>64.0%</td>
<td>60 – 70%</td>
</tr>
<tr>
<td>Long Biased Equity</td>
<td>33.0%</td>
<td>24 – 36%</td>
</tr>
<tr>
<td>Long/Short Equity</td>
<td>15.0%</td>
<td>10 – 20%</td>
</tr>
<tr>
<td>Diversifying Strategies</td>
<td>6.0%</td>
<td>3 – 14%</td>
</tr>
<tr>
<td>Fixed Income</td>
<td>8.0%</td>
<td>3 – 14%</td>
</tr>
<tr>
<td>Cash</td>
<td>2.0%</td>
<td>0 – 8%</td>
</tr>
<tr>
<td>Private</td>
<td>36.0%</td>
<td>30 – 40%</td>
</tr>
<tr>
<td>Assets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private Equity</td>
<td>22.0%</td>
<td>14-26%</td>
</tr>
<tr>
<td>Private Credit</td>
<td>3.0%</td>
<td>0-7%</td>
</tr>
<tr>
<td>Real Estate</td>
<td>6.0%</td>
<td>3-12%</td>
</tr>
<tr>
<td>Energy and Natural Resources</td>
<td>5.0%</td>
<td>3-10%</td>
</tr>
</tbody>
</table>

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- **Long Biased Equity**: Provides long term capital appreciation and protects against the impact of inflation. The Fund invests its Long Biased equity category on a global basis, investing in U.S. Equities as well as non-U.S. equities, in developed and emerging markets, to enhance return and increase diversification as well as passive indices.

- **Long/Short Equity**: Provides less correlated returns to the Long Biased equities in the Fund. Additionally, these investments have the ability to add value in flat or down markets through their short exposure.

- **Diversifying Strategies**: Provides diversification benefits to the overall portfolio by investing in arbitrage, commodity, macro and other non-directional strategies and serves as a source of uncorrelated returns to traditional equity and fixed income investments.

### Fixed Income

Provides principal protection during periods of deflation, provides a source of current income, and reduces overall Fund volatility. These portfolios are primarily domestic and emerging market debt, passive, and credit strategies.

### Private Equity

Provides high real returns and controls overall Fund volatility through investments in private companies. The allocation within private equity could include Growth, Buyout, and Venture Capital.

### Private Credit

Provides potential for attractive risk-adjusted returns, yield, and shorter duration relative to private equity. Private credit provides exposure to more senior portions of the capital structure and can serve as a diversification tool within the private assets allocation. Opportunities in the asset class include but are not limited to direct lending, mezzanine financing, distressed debt, and special situations.

### Real Estate

Serves as a hedge against general price inflation, and as a source of current income. Investments in this area include private portfolio investments, which typically focus on specific niche markets within the real estate sector and public REIT investments, which provide a more liquid means of gaining exposure to the asset class.

### Energy and Natural Resources

Serves as a hedge against inflation while also providing the potential for attractive returns that have relatively low correlations with the remainder of the Fund’s Asset Class portfolio.

### Market Value by Participant

The Fund was created for the purpose of pooling the investments of the University’s Endowment Fund with the investments of the University-related Foundations. As of June 30, 2019, the Fund consists of nine participants, with the Endowment Fund remaining the largest, closely followed by the NC State Foundation. Contributions to the fund continue to be strong, with cumulative additions totalling $312.5 million over the last five years.
News From Our Participants
After a distinguished career spanning six decades, Dr. Charles Stuber is retiring as the founding director of the NC State’s Plant Breeding Consortium.

College of Agriculture and Life Sciences’ Associate Dean for Research Steve Lommel said that a national search for the next consortium director has commenced and that Dr. Paul Murphy, a small grains breeder in the Department of Crop and Soil Sciences, has taken the reins as interim director.

Lommel noted Stuber’s contributions in both science and education. “Charlie was instrumental in the development of DNA marker-assisted selection technology used in major plant breeding programs worldwide,” he said, “and he influenced scores of graduate students.”

Students ‘An Intense Impact’

Some of those students – the officers of the Plant Breeding Club – prepared a joint statement calling Stuber “an exceptional role model.” In the statement, conveyed by club president Lais Bastos Martins, they noted his immense impact on the lives of students at NC State.

They also said he addressed their concerns, supported their participation in professional conferences, encouraged them to be active members of the local and national plant breeding communities, and raised funds for student fellowships. The consortium has funded 41 graduate students so far.

“Dr. Stuber will be sorely missed by students and faculty alike, and he remains a mentor and inspiration for us all,” they wrote.

A Leader in an Area of Strength

Stuber, who earned a Ph.D. in genetics and experimental statistics in 1965, joined the university’s faculty that year as an assistant professor of genetics. After serving in various roles within the U.S. Department of Agriculture and NC State, he had a brief retirement. In 2006, he rejoined the university to establish what was then called the Center for Plant Breeding and Applied Plant Genomics.

The center was designed to stimulate collaboration among about 30 university breeders from four departments and two colleges. Lommel said that this collaboration has been important in sustaining the university’s stature as one of the world’s leading plant breeding programs.

“In addition to that, he and his wife, Marilyn, have made significant contributions that will support the Plant Breeding Consortium’s work for years to come,” he added.

When the Dr. Charles W. Stuber Sr. and Dr. Marilyn N. Stuber Distinguished Professorship in Plant Breeding was established last year, CALS Dean Richard Linton remarked on the influence of Charlie’s dedication and its implications for North Carolina Plant Sciences Initiative (PSI).

“He is one of the key pieces that have made plant breeding so strong at NC State,” Linton said. The endowment “will make a huge difference in what our college is trying to do with through the North Carolina Plant Sciences Initiative.” That initiative is aimed at bringing together scientists from multiple disciplines to solve vexing agricultural challenges while making North Carolina the world’s hub of plant science innovation.

‘A Huge Economic Impact’

Murphy, who has worked at NC State as a small grains breeder for 34 years, became interim director earlier this month. Involved with the consortium since its start, Murphy said his focus as interim director will be to maintain the consortium’s momentum as the search for a new director continues.

“There is rapid movement on the PSI front that we need to focus on,” Murphy added. Meanwhile, the consortium members are working together to review and update courses to prepare students for successful careers in the increasingly fast-moving field of plant breeding. They also are looking at areas where new plant improvement faculty members will be needed.

“The plant breeding group at NC State never ceases to amaze me,” Murphy said. “I came across some recent figures that show the ornamental plant breeders in the Department of Horticultural Science have produced varieties with a retail value of $378 million since 2004.

“This is a huge economic impact from just a small number of applied plant breeding faculty. Repeat this over the diversity of basic and applied research that is being conducted at NC State, and you have a remarkable, dynamic group that is really making a difference. That is why it is exciting to be included amongst the North Carolina plant breeding faculty — they are making substantive contributions to the livelihoods and wellbeing of producers, processors and consumers.”

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Service NC

Inaugurated in 2018, Service NC is a month-long experience that sends Caldwell Fellows to work collaboratively with educators in the Siler City community to offer the first summer enrichment camp for the students of Siler City Elementary. Sixty fourth and fifth grade students were served. Financial support of the A.J. Fletcher Foundation enabled the creation of a hands-on maker-space for the school and provided for weekly field trips.

A significant portion of the school’s population comes from immigrant families with low economic means. It began with a two day training session on NC State’s campus with the Service Mexico team to prepare students to work cross-culturally in a community with which many of the Fellows were unfamiliar. Caldwell Fellows participating in the program engaged in regular and principled reflection with staff from the NC State Global Training Initiative, and participated in weekend excursions to western and eastern North Carolina to learn more about the intersections of immigration, economics, health, and education in the state of North Carolina. The Service NC and Service Mexico teams shared regular group phone reflections across the course of their parallel programs, comparing the challenges and insights of their experiences.

Service NC was led by Fellows Katherine Stubbs ('19) and Layne Baker ('20).

Service Mexico

The Caldwell Fellows’ Service Mexico trip is the program’s flagship international service program. Initiated in 2008 by a Caldwell Fellow from Mexico, a group of Fellows has annually undertaken a deeper understanding of Mexican culture and the complexities of our countries’ connections. Since 2016 the trip has been to the state of Guanajuato to work with the Fundacion Comunitaria del Bajio whose approach to community development is a model of servant-leadership. During the program, Fellows stay with a host family in Mineral de Pozos while working in a rural community. The summer 2018 Service Mexico team continued work of the 2017 team, working with children to paint a mural around their community center.

For Toinette Powers (Class of 2021), like the majority of participants in Service Mexico, this was her first international experience.

“This trip was truly an eye opening experience for me in many ways. The children in San Nicholas del Carmen enjoyed asking me questions about my hair and how to say their names in English. I came to the realization that they were as interested in learning about me and my culture as I was interested in learning about them. Meeting the leaders who have put so much of their time and energy into their community is just simply unexplainable. Being in Mexico I learned more about the daily struggles that Americans will never fully be able to understand. I learned more about the history of Mexico and South America in general. This trip helped me feel 100% content about majoring in International Studies: concentration in Global Relations and minor in Spanish and for this experience - I will always be grateful.”

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Endowment Fund of North Carolina State University
The Heart of the Matter
By: Amy Rossi

When Clarke Atkins and Bruce Keene joined the faculty of NC State’s College of Veterinary Medicine three decades ago, they had no way of knowing how intertwined their careers would become.

They had already worked together at the University of Wisconsin for five years when two positions became available at NC State. “We came here independently of each other,” Atkins said, “but there was some comfort in knowing someone.” As Keene joked, “Worse things have happened.”

Over the next several years, their cardiology practice grew out of internal medicine and into the college’s Cardiology Service, the home of a renowned residency training program, which Keene directs. The Cardiology Service treats and directs the resources from the Seaks Distinguished Professorship to receiving a yearly pharmacokinetic studies, which look at the way the body handles drugs.

“The emphasis on investing in people, not projects, has made an important difference for those working in the Cardiology Service. Keene compared the flexibility of the support from the Seaks professorship to receiving a yearly no-strings-attached outside grant, like the MacArthur Foundation’s “genius” awards. “Professorships like this provide a degree of freedom for faculty,” he said. “It very much provides you with a foundation of support and more ability to be creative in your area of research than otherwise would be possible, including clinical trials and pharmacokinetic studies, which look at the way the body handles drugs.”

The Seaks Professorship has impacted not just Atkins and Keene over the past decade. Both Keene and Atkins, along with many of their colleagues at CVM, investigate new diagnostic or therapeutic strategies in spontaneous disease states. While there is greater variability inherent in this approach, it aligns with the college’s mission to help people and their pets, and some investigators believe that it provides a more predictive model for future clinical research in humans.

Directing the resources from the Seaks Distinguished Professorship to additional staff has allowed Atkins and Keene to do more with spontaneous disease research than otherwise would be possible, including clinical trials and pharmacokinetic studies, which look at the way the body handles drugs.

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This independence allows a professor like Keene, who is on the ground developing research. If we are not working on research for the sake of animals themselves, who is?” Atkins said.

Conducting research on animals with a spontaneously occurring disease, as opposed to a model of disease, is one of the more challenging undertakings in companion animal medicine inquiry. In a modeled disease state, Keene explained, the researcher creates a medical condition in an otherwise healthy animal in order to test a drug or device in a controlled environment that can be replicated.

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This is part of what makes working at the CVM special for both professors. “There’s this matrix,” Atkins explained. “You’ve got the dedicated pet owners on one side. And then you have the veterinarians. We really care about our patients in a way people don’t always get to see in other aspects of everyday life. This matrix is made of synergistic forces coming together.”

Those forces have helped Keene evolve in his thinking about the importance of private support to what he, Atkins and their colleagues do.

“The less-informed me would have hesitated at the thought of asking anyone for support,” he said. “I don’t look at it anymore as asking someone for something. Now I look at the conversation about making a gift as offering a way to help someone enrich their life as much as anything they could get involved in.”

“In terms of return on investment, this is a place that is not only visibly grateful but demonstrably productive with the investments donors have made,” Keene added. “You’d be hard-pressed to find a place that was more fun or more productive to be engaged with than the CVM.”
North Carolina State Engineering Foundation, Inc.
Engineering Foundation Hosts Inspiring 21st Annual Endowment Dinner

The NC State Engineering Foundation was proud to host its 21st Annual Endowment Dinner on April 4th at the Talley Student Union Ballroom. This event allows donors of endowed scholarships, fellowships and professorships to meet the recipient(s) of their award for the current year or semester. Both donors and students alike enjoyed sharing stories of their lives and their love of the Wolfpack and the College of Engineering.

At this year’s event, Dean Louis Martin-Vega spoke of the importance of endowments to our college, our students and our faculty. He acknowledged and gave heartfelt thanks to all of the generous donors who support us in this way and introduced many of them in attendance. Suzanne Gordon, whose family has endowed the Gordon Family Scholarship, is one of these donors. Gordon spoke at the event sharing her thoughts on why people choose to give. There are so many reasons – to pay it forward, to pay it backward (give as you were given to), to support their school you love, to support the growth and opportunity of others, or to honor someone you care about.

Carmen Davis, a student recipient, also spoke at the event. Davis spoke about how meaningful receiving a scholarship was to her and her family, not only financially, but also as a motivator for her success. Davis said that it is an honor for students to be chosen. Davis received the Garwood Family Scholarship Endowment and plans to one day offer a scholarship to an NC State undergraduate student herself. She knows how much it means. Our donors know also.

There are many types of endowments – scholarships, fellowships, professorships and general funds that support research and special programs for students and faculty members. The College has 313 endowed scholarships and 56 endowed professorships. Corporations also endow, not only to help support their surrounding community, but also to gain visibility to prospects that may make great hires after graduation and beyond.

Through endowment giving, donors who care about NC State are able to create a living legacy that benefits the University and its faculty and students over generations. These funds provide financial stability in the face of reduced state support and resources that allow us to compete with peer institutions to attract the most talented faculty members and promising students.

The University’s $1.6 billion Think and Do the Extraordinary Campaign, launched in April 2013, has helped encourage endowment giving to the College of Engineering. The College has raised $179,972,405 out of a campaign goal of $230,000,000.

These gifts give year after year as they are made with the interest generated from a wisely invested corpus. That corpus represents the predetermined endowment amount (or more) and is managed by a nine-member Board of Trustees of the Endowment Fund. The College of Engineering has some scholarships that support more than a dozen student awards per year. There are also scholarships that have been in existence since the 1950s.

Forestry has been Sam Cook’s life’s work. But if not for a suggestion from his older sister decades ago, he may never even have learned the field existed.

Cook was an Alabama high schooler in the late 1970s when his sister told him she’d heard about an interesting program at Tuskegee University, where she was a student. He could start studying at Tuskegee, she said, then transfer to another accredited university to complete a degree in forestry.

“Coming to State really opened my eyes,” said Cook, now the executive director of forestry assets for the College of Natural Resources. “I got to see different careers and work with different people. I was well prepared when I came out.”

Now, he is using the power of philanthropy to open other students’ eyes to forestry and NC State. Cook and his wife, Sherry, recently established two funds to support the college’s recruitment of forestry students from underrepresented groups.

““What I’m passionate about is getting more minorities, especially African-Americans, into the forestry industry,” Cook said. “And I wanted to create a pathway that we can have unrestricted funds (so) that we can invite students to come visit our university, see what our college has to offer and show them a career.”

According to the Bureau of Labor Statistics, African-Americans make up roughly 9 percent of the total forestry and logging workforce. In fall 2017, 4 percent of forestry and environmental resources students at NC State were African-American. That’s a sizable increase from the previous 10 years, when African-Americans made up roughly 2 percent of the forestry student body, based on data from the Office of Institutional Research and Planning.

Cook attributes those disparities to a lack of awareness of forestry among African-Americans. His philanthropic gifts extend work he already does to make sure minority students know about opportunities in the field.

NC State Natural Resources Foundation, Inc.
Widening the Trail He Followed
check-ins that touch on forestry, family and anything in between. This past summer, Cook helped Dunn get an internship with a South Carolina law firm that focuses on legal issues related to forestry. The experience set the template for what Dunn hopes to do after graduation: find a career where the human and technical aspects of forestry come together.

Odds are, Sam Cook will keep helping him – and other prospective forestry students – find the right path.

“I’d be lost without Sam,” Dunn said. “I wouldn’t know where I was going. He’s been just an incredible compass as far as understanding what I want do with my career.”

In 2016, Cook took on his current role. As executive director of forestry assets, he oversees 10 forest properties that support research and generate more than $3 million annually for the college. Cook is also the liaison between the foundation, the NC State Board of Trustees and the College of Natural Resources Foundation Board.

And, by recruiting and mentoring students, he carries forward the work Jervis did with him.

One of those students is Kenneth Dunn, a first-year master’s student from Durham. Dunn spent much of his childhood in the woods and studied environmental engineering as an undergraduate. But he never considered forestry until meeting Cook during his junior year, at orientation for a Conservation Trust for North Carolina program. Over the next few weeks and months, the two met regularly, and Cook sold Dunn on forestry.

“Forestry has taught me to work hard and that if you don’t know something, ask it,” Dunn said. “But the biggest lesson has nothing to do with the trees: It’s that being able to get along with other people will take you further than anything else.”

Cook and Dunn keep in touch through weekly
“I found it much harder to think and do extraordinary things when I had the financial burden of paying for my education,” Kirkwood said. “Once that was lifted off my shoulders, I feel like I really have fulfilled the Campaign slogan with the time I’ve been able to spend thinking about my coursework and doing research in the lab. It has been like night and day since I received those scholarships.”

Kirkwood has also gained valuable professional experience in the lab. The results of the seafood research ended up becoming her first publication when the paper she co-authored with Bereman, Beri and Muddiman appeared in Analytical and Bioanalytical Chemistry.

She also has had the opportunity to attend national conferences in Minneapolis and Princeton, presenting a poster and delivering a lightning talk.

“I was one of two undergraduates who gave a talk,” she said. “It was outside of my comfort zone, but I’m now better at communicating my research.”

This is not quite the path Kirkwood, who grew up in Ohio and moved to Wilmington with her mother when she was a junior in high school, envisioned when planning for college. She was interested in chemistry but also design, and she was considering becoming a veterinarian. Because NC State is highly regarded in all three fields, it was the right choice for her.

As Kirkwood grew more serious about chemistry, the encouragement of her professors led her to the research lab. “I had for general chemistry my sophomore year, and I loved it. When I told the professor who taught the course how much I loved teaching, he said if there was any chance I was thinking about going into academia, I should do research as soon as I can,” she said.

Kirkwood wanted to undertake chemistry research with a biological application, which led her to the Muddiman Lab. Because of her interest in toxicology, she joined the lab’s ALS research project.

She uses a mass spectrometer – an instrument that converts molecules to ions in order to measure their characteristics – to identify different molecules in a variety of samples, such as water and seafood, in the team’s study of the environmental triggers of the disease.

After their paper was published, a researcher in Australia contacted the lab. He had plasma samples from patients with ALS but lacked the advanced instrumentation for analysis and offered to share them. Kirkwood has most recently been focused on these samples, which aligns with her interest in the human health side of analytical chemistry.

In addition to her research in the lab, Kirkwood works with the College of Sciences’ communications and marketing team.

“I definitely wouldn’t have had time to try that out without scholarship support,” she said. She is excited about her newly gained WordPress skills because most labs use that platform, and she will be able to help effectively share the work of the next lab she joins.

And that next lab will be at NC State: Kirkwood has accepted an offer to pursue a Ph.D. in analytical chemistry in the fall. She will be joining the lab of Erin Baker, associate professor of chemistry. While she is interested in a career in academia, she isn’t committed to any one path yet.

“That’s one thing I’ve learned being here: Keep an open mind about where your future is going,” she said. “My plans from freshman year are completely different from what my plans are now, and I think I’ve ended up exactly where I was supposed to end up.”

NC State University College of Sciences Foundation, Inc.
Meet The Solomon Scholars
By: Christy Sadler

Nineteen extraordinary students were part of the College of Sciences’ signature undergraduate scholarship program in 2018-19.

The Daniel L. Solomon Scholars Program is named for the college’s inaugural dean, who spent more than 30 years at NC State before retiring in 2015. Solomon Scholars are selected based on academic achievement, scientific leadership qualities and distinctive life experiences. The program is currently made up of 16 named scholarships.

Last academic year, the program awarded $90,000 in scholarship support and more than $18,000 in experiential funds from a $3.3 million endowment. In addition to renewable scholarship awards, the program offers community-building activities and experiential learning opportunities to help students develop their leadership skills. Donor support is crucial to funding these scholarships and opportunities.

The 2018-19 class of Solomon Scholars represented 11 fields of study and had an average NC State GPA of 3.6.

2018-2019 Solomon Scholars

Molly Amon,
Dean’s Circle Scholarship, Zoology
(December 2019)

Victoria Campos,
William A. Kieschick and Leslie A. Bjelk Scholarship, Genetics (May 2022)

Leigh Dement,
Lawrence H. Bowen Scholarship, Chemistry
(May 2022)

Marc Diard,
Dean’s Circle Scholarship, Marine Science
(May 2020)

Bethany Furry,
Eric C. and Rita L. Bigham Scholarship, Chemistry (May 2022)

James Goodnight,
Linda Balfour and Robert Hill Scholarship, Meteorology (May 2020)
North Carolina Tobacco Foundation, Inc.  
Student Spotlight: Aspiring Plant Doctor Josh Henry  
By: Kevin Moye

Growing up in the inner city of Cleveland, Ohio, Josh Henry's elementary school required students to get involved in agriculture.

From that program onwards, Henry was fascinated. For his undergraduate studies, he attended the Ohio State University, earning a degree in sustainable plant systems with a specialization in horticulture.

Now, Henry has settled at NC State, where he obtained his master’s and is working toward a Ph.D. in horticulture and crop science.

How did you become interested in horticulture?

I went to the only school that I know of in the Cleveland school system where the land was donated by a farmer. And the farmer, as part of donating the land to the school system, said that half the land could be used for the school itself, and the other half of the land had to be used for teaching the students about agriculture. And so that has been going on for nearly 100 years.

When you’re in the fourth grade, they take you out and they teach you about gardening and plants and things like that. That’s where I got my start. It was taught by the Ohio State University Extension Master Gardeners. And then I continued to volunteer with them up until college.

Tell us about the work that you’re doing now in the field.

I’m half in horticulture, half in crop science. I’m working with drones, trying to diagnose nutrient deficiencies in tobacco fields. So we’re using hyperspectral sensors to gather reflectance data from the plants. We’re inducing different nutrient deficiencies and trying to get the sensors to pick up the symptoms that we’re seeing in the field. And then we’re going to do some statistical analysis to tell between all of the different deficiencies.

What do you plan on doing after you graduate?

My interest for the past several has been going into a research and extension position. I really

Alexander Mink,  
Dr. and Mrs. Michael Peirson Dean’s Scholarship, Applied Mathematics (May 2022)

Dhuru Patel,  
Dean and Gail Bunce Scholarship, Biology (May 2021)

Michael Rehnberg,  
Goudes Merit Scholarship, Meteorology (May 2020)

Ben Stemen,  
Lawrence H. Bowen Scholarship, Chemistry (May 2021)

Jaye Sudweeks,  
Solomon Scholars Experiential Learning Award, Applied Mathematics (May 2019)

Sreram Venkat,  
Richard R. Patty Scholarship Award, Physics and Applied Mathematics (May 2021)

Peyton Wood,  
Francis E. McVay Scholarship, Applied Mathematics and Statistics (May 2020)
like working with plant research, and also I’m getting more into the precision ag and remote sensing aspects. So I like the idea of doing research, but I also like the idea of extension.

Extension is what got me into this field in the first place, because of the Master Gardeners. And it’s something I’m really passionate about, working with growers and farmers to help them with their problems. I feel like helping growers with their problems leads to better research ideas, so I definitely would like to have a position that uses both research and extension components.

Tell us about the outstanding poster award you recently received.

I presented at an international conference held in Portland on horticultural substrates. And an important part of horticultural substrates is plant nutrition. The poster that I presented was on nutrient deficiencies of red lettuce.

What makes that interesting is that, compared to other plants, red leaf lettuce has a different leaf color than most other plants, so symptoms of nutrient deficiencies look very different than they would on a green-leafed plant. There’s been plenty of work done on lettuce nutrient deficiencies before, but the red leaf coloration was new.

You talked about your passion for extension. How do you want to contribute to extension?

Hopefully I’d be staying in agriculture, horticulture of some sort. I really like taking days to go out and visit growers, to walk their fields, go through their greenhouses, see what they’ve got going on and help diagnose their problems – to ask them, “What are some problems you’re seeing right now? How can I help?” Basically by being a plant doctor, going around and seeing what the ailments are and trying to help them.

What have you learned at NC State that you will take with you once you graduate?

I’ve learned a lot about just how academia works from a graduate standpoint. One thing I really like about NC State is the size of the school. Ohio State, the main campus is twice as large as NC State’s main campus, as far as student population is concerned. So that was just way too big. And then the two-year ag college I went to, we only had 700 students. So NC State is a really nice middle of the line. Here at NC State, I feel like I’m a part of the clubs and the different communities within the College of Ag, and also branching into some of the statistical groups. I’ve been able to mesh here very well.

The most impressive thing about Ed Breitschwerdt isn’t the awards he has — and there are many of those. It’s not that he runs a world-renowned infectious disease laboratory or that it’s an understatement to call his research output prolific.

What stays with you is what it means to him to teach a single student.

He talks about it as not a job but a mission. Students remember him because he challenges them, but always with a purpose. You go to him not to hear what you want to hear but what you need to hear and you’re better for it.

Breitschwerdt, a professor of medicine and infectious diseases who came to the NC State College of Veterinary Medicine in 1982, has influenced students in every CVM class to step through the college’s doors and then out into the veterinary profession.

“When it’s all said and done, the only thing you have is your reputation and character, and mine’s far from perfect on either side,” said Breitschwerdt. “But I’m not going to have a student who I’m responsible for teaching, and who is going to go out there and practice veterinary medicine, not do what’s expected of them. Not going to happen.”

Breitschwerdt’s influence runs deep. He has trained many members of the CVM family — residents, interns, now colleagues — who have gone on to become endowed professors. On April 3, he became one himself when he received the Melanie S. Steele Distinguished Professorship in Medicine.

The $1 million endowment, which includes a generous gift from Steele, a longtime NC State Veterinary Hospital client and supporter, with the rest in matching funds, supports a professor active in teaching, research and clinical practice in small animal medicine.

Breitschwerdt has never stopped doing all three.

“To do something that has an impact, I never dreamed would happen to a farm boy from Maryland,” he said.

Breitschwerdt’s career is what happens when someone, unencumbered by what’s conventional, allows passion to guide the way.

He was never formally trained as a researcher, but is widely recognized as a world leader in the study of Bartonella, a bacterium that causes an array of diseases in companion animals and humans.
He does all this while still seeing clinical internal medicine cases in the hospital three months out of the year. And he does all this after sometimes starting his day at 6 a.m. responding to consult requests involving human infectious disease cases.

Breitschwerdt’s determination and grit speaks to Steele, the professorship’s namesake. Dogs are important members of her family and they’re also her life. A giant in the world of show-dog breeding, Steele has taken home numerous best-in-show awards for her greyhounds and other breeds. For nearly thirty years, she has always taken her dogs to the NC State Veterinary Hospital for specialty care, including cardiology, soft tissue and orthopedics.

Even though Steele, a board member of the North Carolina Veterinary Medical Foundation, moved from Charlotte to Bluffton, S.C., seven years ago, she still brings her dogs to NC State. She has long valued the friendships she has made with the hospital’s clinicians and respects their willingness to work so closely with her to find the best treatment solutions for her dogs. She sees the incredibly vital impact of Breitschwerdt’s work.

“He’s a gentleman and a giant in his field, and this kind of support is truly made for someone like him,” said Steele. “He’s phenomenal. We’re rewarding someone who truly, completely deserves it.”

A Clear Purpose

One dog changed Breitschwerdt’s life.

Not long into his infectious disease career at the CVM, a colleague at the Centers for Disease Control and Prevention found out that the bacterium Bartonella, that no one knew existed in North America, caused cat’s scratch disease in humans.

That led to Breitschwerdt’s research into understanding Bartonella in cats. Eventually, his Vector Borne Diseases Diagnostic Laboratory was the first in the world to find a case of Bartonella infecting a dog. That discovery changed the focus of his research program and continues to influence its direction.

Before 1990, only one Bartonella species had a name. Now there are nearly 40 and most connected to wide range of diseases, including heart infections and other chronic illnesses in cats, dogs and other animals. Fifteen years ago, only three human diseases — cat’s scratch disease, trench fever and Carrion’s disease — were known to be caused by Bartonella organisms. Now, a growing number of Bartonella species and subspecies impact humans.

More is being learned about Bartonella every day, Breitschwerdt’s is a big part of that growing scholarship.

“If you ask me what keeps me going now, it’s a single genus of bacteria,” said Breitschwerdt. “It’s a genus of bacteria that I believe is of immense importance to society. It’s a genus of bacteria that I believe is causing more disease than anyone would have ever guessed in human and veterinary medicine.”

Breitschwerdt’s innovative research is particularly impressive to Steele, who regularly must closely monitor the chance of tick-borne diseases affecting her dogs.

“What NC State has done for human and animal medicine is unbelievable,” said Steele. “It’s thrilling to think about where we and Dr. Breitschwerdt can go in the future.”

Breitschwerdt doesn’t really think of the future — he thinks about his research. He thinks about it when he drives to work and when he drives home. During this interview, he was thinking about the most recent published Bartonella study he co-authored, looking at the prevalence of the bacterium in blood donors in Brazil.

“I know what I think is important,” said Breitschwerdt, “and that’s the research questions that need to be answered by veterinary medicine between now and the end of my career. If 1/10th of what we published ends up being upheld by other researchers in regard to the devastation that this has caused families around the world, that will be enough for me.”
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