

Companion document to ClemsonForward

STRATEGIC PLAN

EXCELLENCE

DIVERSITY

INNOVATION

TRANSFORMATION

Clemson University

College of Engineering, Computing
and Applied Sciences

REAL

THE MISSION OF OUR COLLEGE is to educate, create and disseminate new knowledge, engage our students in critical thinking and thereby inspire new discoveries – the cutting-edge innovations of tomorrow, leading to transformative economic development and broadening our impact as a land-grant university.

MISSION

INNOVATION THROUGH TRANSLATION

TRANSFORMING KNOWLEDGE THAT CREATES A HIGH IMPACT ON SOCIETY

We live in a world that is growing increasingly interconnected and complex. Adapting to change is the grand challenge of our time. Fundamental drivers such as globalization, growing economic interdependence, population growth and resource depletion mean that sustainability challenges are not only increasing, they are rapidly evolving to become more unpredictable and viral. What's more, the rate of change is accelerating faster than our solutions, a phenomena occurring in all facets of life from health to economics. Like our challenges, our approaches must also evolve. Adaptation will require continual innovation, meaning the currency of the future will be ideas, and the framework will be one of shared partnership. Our problems are too complicated for any single entity to solve alone — be it government, industry or academia. We must develop not only innovative technologies and curricula, but also partnerships that support idea generation. We must create an organizational and leadership culture for innovation and collaboration.

As a land-grant university in the heart of the Interstate 85 corridor, we are uniquely positioned both strategically and geographically to take a leadership role to develop such innovative partnerships.

The College of Engineering, Computing and Applied Sciences will transform lives and be recognized for research, education and scholarship that make or have a **GLOBAL IMPACT**.

Through the creativity and hard work of our faculty, staff and students, we will cement our reputation as global game-changers in the fields of engineering and science, positively impacting technologies and economies everywhere.

ClemsonForward, the University's strategic plan, is built on four key foundations: **Research**, **Engagement**, the **Academic Core** and **Living**, which spells **REAL**. The college's strategic plan provides specific goals and tactics that align with each of the four areas.

Goal One: **Leadership in Integrated Translational Education.**
Aligns with ClemsonForward: Academic Core

Goal Two: **Excellence in High-Impact Research through the Creation and Translation of New Knowledge and Technologies.**
Aligns with ClemsonForward: Research

Goal Three: **Economic Development Impact through Translational Research, Innovation and Education by Integrating Innovation Campuses.**
Aligns with ClemsonForward: Research, Engagement, Academic Core

Goal Four: **Collaborative Translation through Innovative Leadership, Partnerships, Engagement and Experiences.**
Aligns with ClemsonForward: Engagement, Living



GOAL ONE

LEADERSHIP IN CROSS-DISCIPLINARY TRANSLATIONAL EDUCATION

OUR UNIQUE AND INTEGRATED ENGINEERING AND SCIENCE STRUCTURE and world-class STEM experiences attract top talent and provide Creative Inquiry undergraduate research integrated within the curriculum, global engagement programs and community- and service-learning programs.

- **EMAG!NE:** A faculty-guided program for middle and high school students to test their creativity and technical skills in a series of engineering challenges.
- **CREATIVE INQUIRY AND STUDY ABROAD:** Research experiences that prepare the next generation of global citizens to tackle society's toughest problems.
- **PROGRAMS FOR EDUCATIONAL ENRICHMENT AND RETENTION (PEER):** A mentoring program that helps undergraduates from underrepresented groups carry out their plans for academic achievement and enrichment.
- **RESIDENTS IN SCIENCE AND ENGINEERING (RiSE) LIVING-LEARNING COMMUNITY:** A unique residential community designed to ease the freshman transition to college.



EMAG!NE



HAITI

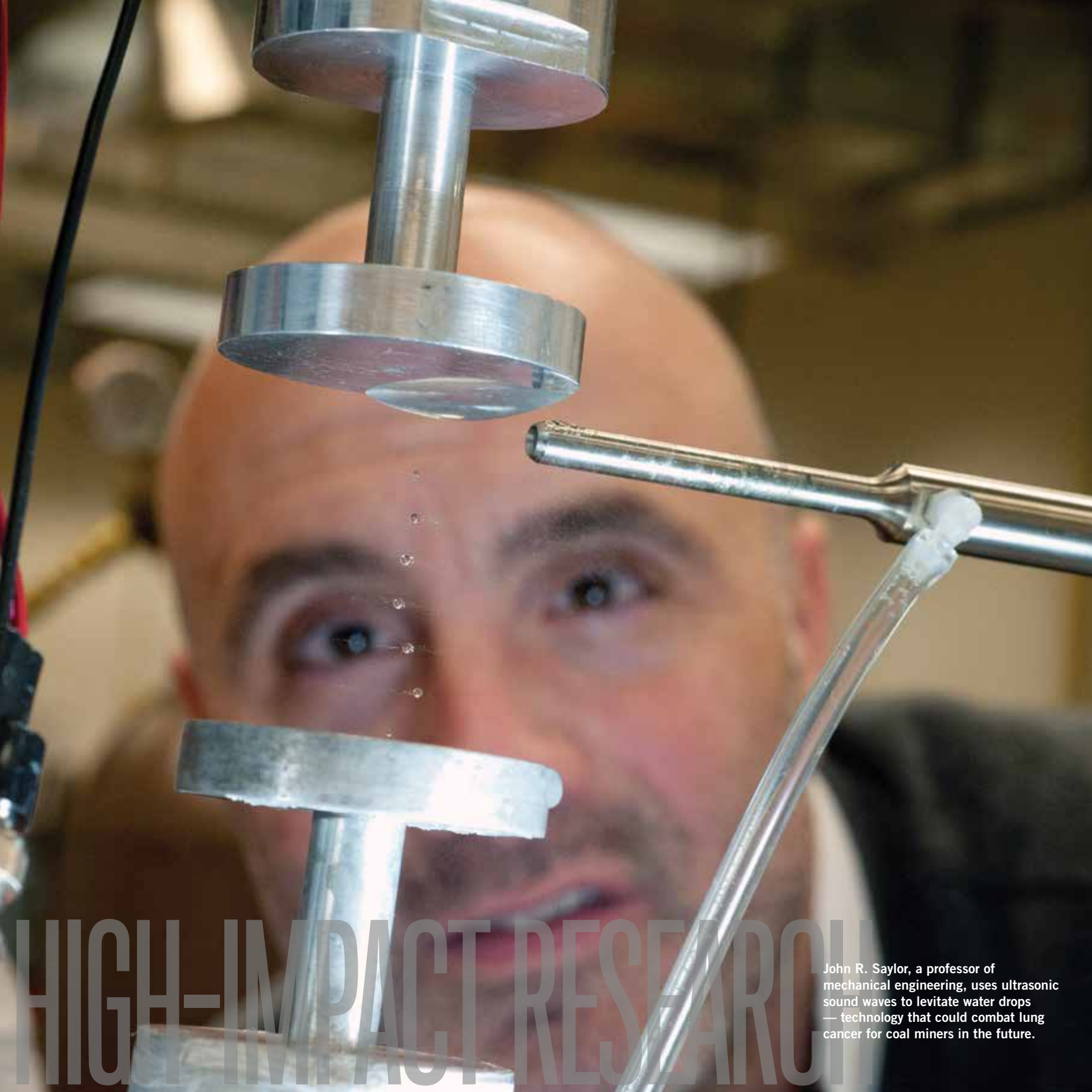


RISE

Amod Ogale (left) secured \$2 million for research that could lower costs of airplane and automotive parts.

CROSS-DISCIPLINARY

REAL



GOAL TWO

EXCELLENCE IN HIGH-IMPACT RESEARCH THROUGH THE CREATION AND TRANSLATION OF NEW KNOWLEDGE AND TECHNOLOGIES



ULTRA-LIGHT AUTO DOORS



CARBON NANOTUBES



TISSUE REGENERATION

BIG PROBLEMS require a team approach. Our convergent research cuts across disciplines to tap the brightest minds. We work together to shape the future in a rapidly changing world. The translational research we do with business partners serves as a prime example of our convergent research and how we stay on the cutting edge. Our students get world-class research experiences, while businesses get some of their best ideas from students. Examples of the college's translational research include:

- **FUEL-SAVING, ULTRA-LIGHT AUTO DOORS:** Helping automakers in their race to meet federal fuel economy standards with carbon-fiber-reinforced thermoplastic composites.
- **CARBON NANOTUBES:** Technology that starts with building blocks about 10,000 times smaller than the diameter of a human hair and could power industrial tools, run consumer electronics and help reduce carbon emissions.
- **TISSUE REGENERATION:** Medical advances that could cure aneurysms, repair rotator cuffs and help build heart valves, developed in a cutting-edge lab equipped for sterile work with human stem cells and scaffolds.
- **UPDATING THE NATION'S ELECTRICAL GRID:** Revolutionizing how electricity is generated and delivered to homes and businesses, leading to the first major overhaul of the electrical grid since it was built a century ago.
- **ULTRASONIC STANDING WAVES:** Levitating water droplets long enough to intercept most of the dangerous particles from coal dust and diesel exhaust, potentially saving miners' lives.

John R. Saylor, a professor of mechanical engineering, uses ultrasonic sound waves to levitate water drops — technology that could combat lung cancer for coal miners in the future.

HIGH-IMPACT RESEARCH

REAL



GOAL THREE

ECONOMIC DEVELOPMENT IMPACT THROUGH TRANSLATIONAL RESEARCH, INNOVATION AND EDUCATION BY INTEGRATING INNOVATION CAMPUSES



CURI



CU-ICAR



CUBEInC

IDEAS ARE THE CURRENCY in America's knowledge-based economy — and our four innovation campuses serve as idea factories. The engineers and scientists at our innovation campuses are doing translational research that creates new knowledge. Our work drives economic development, sustainability and competitiveness, while making our curriculum highly relevant. The campuses are dispersed throughout the state to best serve industries and communities that need them. Each innovation campus is focused on a different area of research and education. The areas are: energy and sustainable environment; transportation and manufacturing; advanced materials; and health and biotechnology.

- **CLEMSON UNIVERSITY RESTORATION INSTITUTE (CURI):** A North Charleston economic-development model that is home to the world's most advanced windturbine drivetrain testing facility, energy-grid simulator and the Zuckerman Family Graduate Education Center.
- **CLEMSON UNIVERSITY INTERNATIONAL CENTER FOR AUTOMOTIVE RESEARCH (CU-ICAR):** A public-private partnership in Greenville on its way to becoming the world's premier facility for automotive, transportation and manufacturing research.
- **CLEMSON UNIVERSITY ADVANCED MATERIALS RESEARCH LAB (AMRL):** An Anderson research hub for advanced materials that offers huge opportunities to improve lives and contribute to an industry growing across the Southeast.
 - An internationally recognized state-of-the-art facility focusing on research programs in optoelectronics, chemistry and materials science.
 - Home to one of the nation's most outstanding electron microscopy facilities with a professional staff that provides services to private industry and academic clients.
- **CLEMSON UNIVERSITY BIOMEDICAL ENGINEERING INNOVATION CAMPUS (CUBEInC):**
 - A lab complex at Greenville Health System's Patewood Campus lighting the fuse for a boom in the health and biotechnology industries.
 - Developing high-impact medical technology and devices for disease management and technology transfer from bench to bedside.

Students share ideas for business products and concepts and receive instant feedback from mentors as part of The DEN, which stands for The Design and Entrepreneurship Network.

ECONOMIC DEVELOPMENT

REAL



GOAL FOUR

COLLABORATIVE TRANSLATION THROUGH INNOVATIVE LEADERSHIP, PARTNERSHIPS, ENGAGEMENT AND EXPERIENCES



CEDC

As a land-grant university in the heart of the fast-growing Southeast, we are uniquely positioned both strategically and geographically to take a leadership role to develop innovative partnerships. We welcome and value working with a broad-based group of constituents and stakeholders to create impact not only in our community and state, but across the nation and the world for the greater public good. Working together, we build on each other's strengths to develop world-changing innovations while creating a better academic experience for faculty and students.



DEEP ORANGE

- **CLEMSON ENGINEERS FOR DEVELOPING COUNTRIES (CEDC):** A service-learning course that is supported through the Creative Inquiry program at Clemson University.
 - Started by seven civil engineering students in 2009 wanting to use their knowledge to make a difference in the world.
 - Working with local communities in the Central Plateau of Haiti to develop sustainable solutions that improve the quality of life.
- **DEEP ORANGE:** A project in which graduate students develop an automotive prototype each year.
 - Includes system analysis and integration, product development, software analysis, architecture and design to create innovative automotive prototypes in partnership with industry.



TANZANIA

- **MEETING GRAND CHALLENGES IN DEVELOPING COUNTRIES:** Designing and developing systems to keep premature newborns at just the right temperature to save their lives when traditional incubators are unavailable, a common problem in Tanzania and other developing countries.
- **THE DEN (THE DESIGN AND ENTREPRENEURSHIP NETWORK):** Brings together students and potential industry and investment partners to transform student ideas into student companies.
 - Facilitates student-based, experiential learning and application of design and entrepreneurship at a university, community and global level.

PRIORITIES

Our vision and the goals for achieving it, position us to become one of the nation's premier public colleges of engineering, not only in the state and nation, but also internationally.

To cement this global leadership role, we need to go beyond imagining a better future and begin to create it. To ensure that we turn our vision into reality, we have defined four specific priorities.

WORLD-CLASS FACILITIES

We will create cutting-edge facilities that include space for collaboration and state-of-the-art research and technological capabilities. These spaces will create an ecosystem that will foster creative thinking and innovation.

VIRTUOSO TALENT

We will attract and retain diverse faculty and students who are recognized for their outstanding abilities and scholarship. The synergy created by their intellectual interaction and collaboration will lead to transformative innovations, having an impact on lives everywhere.

EXEMPLARY EDUCATIONAL EXPERIENCES

As the traditional view of higher education changes, the focus is becoming more interdisciplinary and experiential. To address this change, we will develop cutting-edge pedagogies, integrating classroom, research and real-world experiences.

IMPACTFUL RESEARCH AND SCHOLARSHIP

In our role as global game-changers, we will exemplify Peter Drucker's vision that "knowledge has to be improved, challenged and increased constantly." We will be our generation's leaders as we disseminate the knowledge needed to address the complex issues of the 21st century global society.

Advanced fiber optics in action



Our overarching goal is to be one of the nation's premier public colleges in engineering.

