



# CABLE

Consortium for  
Advanced Bioeconomy  
Leadership Education

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Leadership Training  
for the Bioeconomy  
of the Future



**THE OHIO STATE UNIVERSITY**  
COLLEGE OF FOOD, AGRICULTURAL,  
AND ENVIRONMENTAL SCIENCES



This report was prepared for the Consortium for Advanced Bioeconomy Leadership Education (CABLE), an initiative funded by the U.S. Department of Agriculture (USDA) and directed by The Ohio State University (OSU) in partnership with 20 universities nationwide. CABLE's purpose is to prepare promising university students for leadership roles in the U.S.-based bioeconomy.

The need for future bioeconomy leaders is underscored by Bio.org, which estimated the global economic value of the bioeconomy to be \$355.28 billion, with the United States generating more than \$205 billion in direct value. When indirect values are included, the economic impact of the U.S. bioeconomy is \$505 billion and 4.63 million jobs (bio.org). CABLE addresses a pressing need to prepare technically-skilled workers with comprehensive leadership skills to ensure continued growth and success of the bioeconomy.

The need for specialized programs in higher education is directly attributable to the enormous workforce growth projected for the bioeconomy. Moreover, this growth will require a new kind of leader with expert ability to manage complexity and rapid changes associated with technological innovations. CABLE brings together the nation's premier research institutions, the U.S. government, and the private sector around the mission of preparing, cultivating, and mentoring the country's most promising technology-focused students to become these leaders of the future.



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*I gave you a student. You gave me back a leader.*

**CABLE Faculty Mentor,  
Dr. Mark Mba Wright,  
Iowa State University**

## THE APPROACH

**Strengths-Based Leadership Training** operates from the premise that people have greater potential for growth if they build on their strengths instead of trying to improve weaknesses. (Rath & Conchie, 2008; Cameron, 2012; Northouse, 2016). CABLE requires students to assess their strengths, set goals for growth, and continually examine their progress in meeting those goals, all under the guidance of their faculty mentors and professional leadership coach.

**Project-Based Learning** presents a rich learning environment in which students are able to construct knowledge through real-world, personally meaningful experiences. CABLE students learn about the bioeconomy by undertaking two year-long projects.

**Business Communication Practicums** instruct students on the key principles and practices of professional networking. Students are given several opportunities to practice what they learn at professional industry conferences, with introductions and presentations to industry executives.

## INDUSTRY COLLABORATORS

3-Bar Biologics  
Aemetis  
Anellotech  
ATIP Foundation  
B4 Branding  
BASF  
BETO  
BioFuels Digest  
Braskem

CAAFI  
Calysta  
Campbell Consulting  
Clariant  
Coca-Cola  
ConVergence Advisers  
Enerkem  
Ford Motor Company  
Genera Energy

Geyo  
DSM Biobased  
IEA Bioenergy  
Kilpatrick Townsend  
Kincannon Reed  
LanzaTech  
Leidos  
Manta Biofuel  
National Biodiesel Board

Novozymes  
Oak Ridge National Lab  
Oberon Fuels  
The Ohio Soybean Council  
PepsiCo  
Plastics Industry Association  
POET  
PTI Global Solutions  
Renewable Energy Group

RoofMaxx  
Sherwin-Williams  
Stephen M. Gould Company  
Spruce  
Syngenta  
USDA BioPreferred  
Velocys

## INCREASING DIVERSITY THROUGH INCLUSIVE EXCELLENCE

Each year, promising student participants are selected by faculty at the CABLE partner universities. The students are chosen based on their academic performance as well as on evidence of their leadership potential. Upon admittance to the program, they undertake the 10-month CABLE experience under the guidance of a professional leadership coach, a faculty mentor, and an industry liaison.

Since CABLE's inception in Autumn, 2017, three cohorts of students have participated in the program. A hallmark of the CABLE approach is the diversity of its student participants.

### THE RESULTS ARE IN

Each CABLE cohort has been assessed by an external evaluator who determined the program's effectiveness using the Kirkpatrick/Phillips (1959/2006) model for evaluating training programs and Return on Investment (ROI) (Figure 1). The model is premised on a chain of impact, whereby results at the first level (satisfaction) lead to results at the second level (learning), and so on.

The CABLE analysis focused on the first two levels of evaluation (i.e., satisfaction and learning) and explored indicators of potential behavior change to make preliminary determinations of individual impact (level 3).

The evaluator collected data through quantitative and qualitative methods, including pre- and post-program surveys (administered to treatment and control groups), focus groups, and interviews. Key findings emerging from an analysis of the first two years of the program are summarized in figures 2 through 4.

FIG. 1

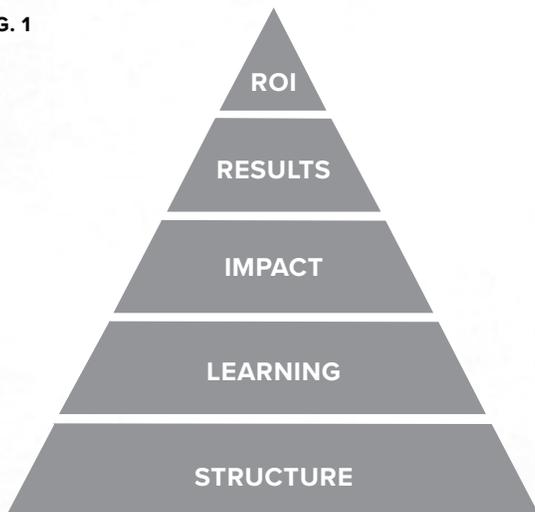
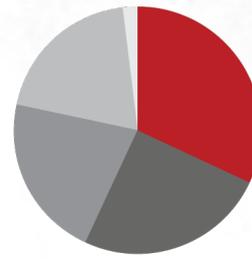


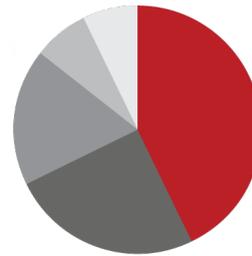
FIG. 2



#### LEVEL OF SCHOOLING



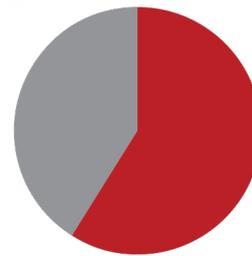
FIG. 3



#### RACIAL DIVERSITY



FIG. 4



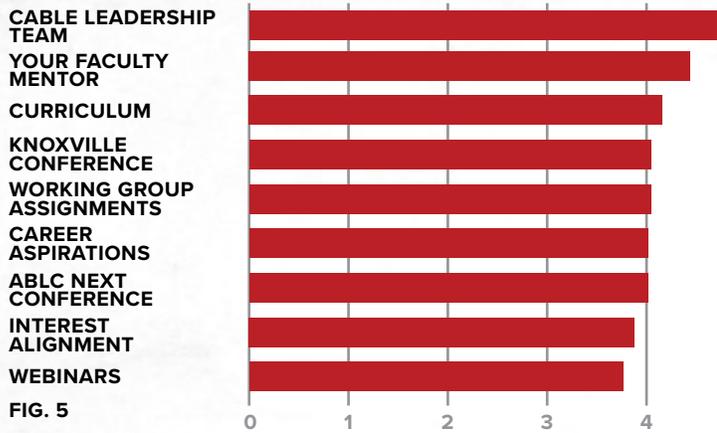
#### GENDER DIVERSITY



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*CABLE did great work arming us with leadership skills and knowledge of the bioeconomy. I am a better scientist and leader because of this program. Thank you all!*

**CABLE Student Delegate**

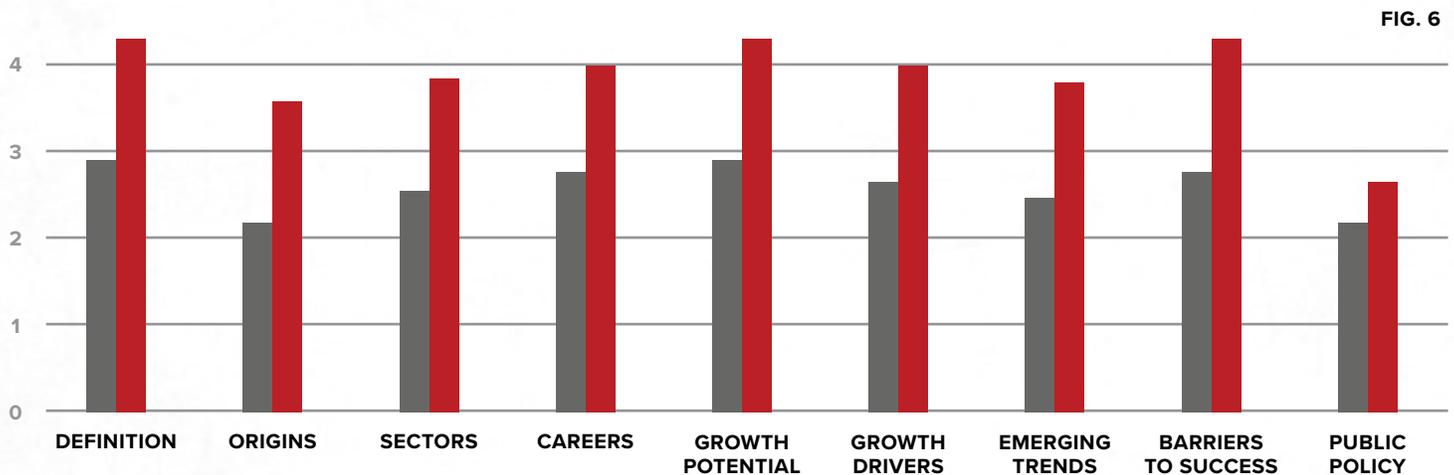


## A TRACK RECORD OF SUCCESS: STUDENT SATISFACTION

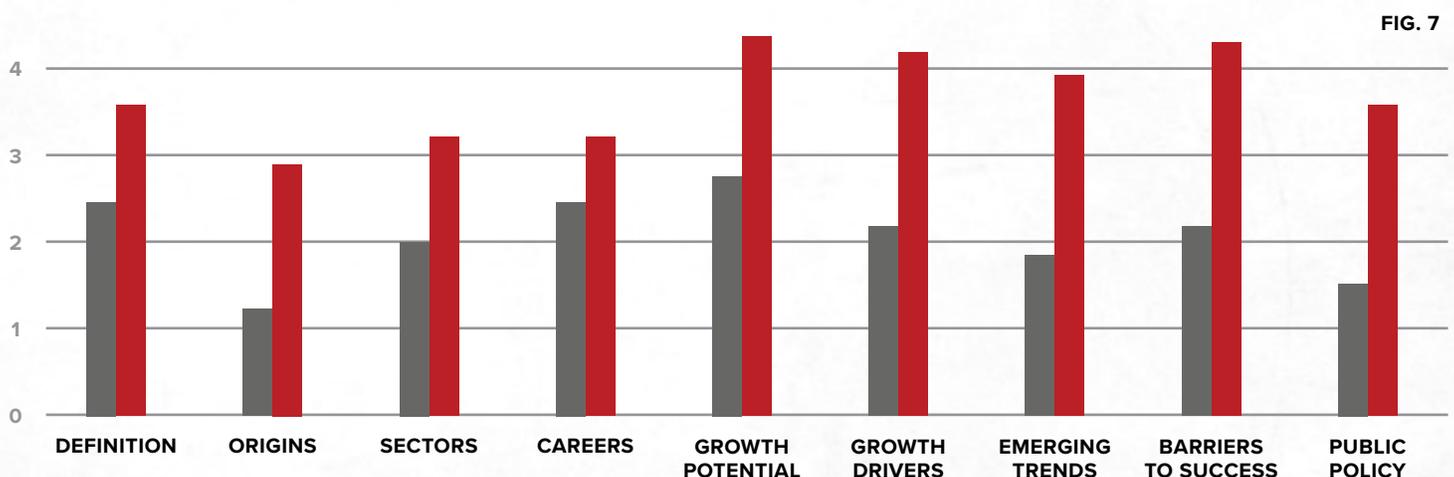
Participating students were asked a series of questions related to how satisfied they were with CABLE. Overall, students expressed high levels of satisfaction with all aspects of the CABLE program. Three facets stood out as particularly well-received: the CABLE leadership team, faculty mentors, and the CABLE curriculum. These three survey items produced satisfaction results of 4.14 or higher on a 5-point scale.

## DEMONSTRATED KNOWLEDGE GAINS

Participating students demonstrated large gains in their knowledge about the bioeconomy. Thirteen different questions inquired into topics such as emerging trends in the bioeconomy, drivers of growth, obstacles to growth, and more. Figure 6 illustrates the difference in students' responses on the pre- and post-program tests. In all areas, students made gains of at least 1.2 points on a 5-point Likert scale. Students grew the most (at a tremendous rate of 1.5 points on a 5-point Likert scale) in their knowledge about the diverse sectors of the bioeconomy as well as barriers to its success (e.g., regulatory environment, fossil fuel industry, etc.).

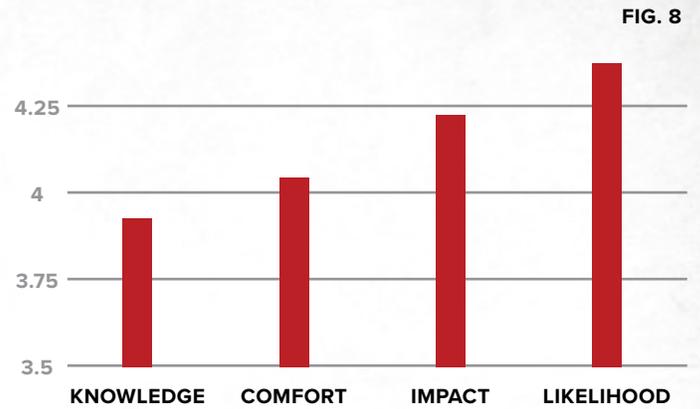


Participating students' growth was compared against that of the control group. A comparison between the control group students and the participating students shows that on every measure, CABLE students demonstrated statistically significant greater growth in their knowledge about the bioeconomy. (See Figure 6)



## SHAPING CAREER PATHWAYS

As behavioral changes haven't occurred yet for most of the participants, the evaluator analyzed data related to behavior precursors. A variety of measures were used, including knowledge gains, comfort with CABLE content, and likelihood to pursue relevant careers. Figure 8 illustrates the trajectory of knowledge gains impacting likely career outcomes. This trajectory reinforces the possible connection between student learning in the CABLE program and how they plan to use their new knowledge in their future careers.



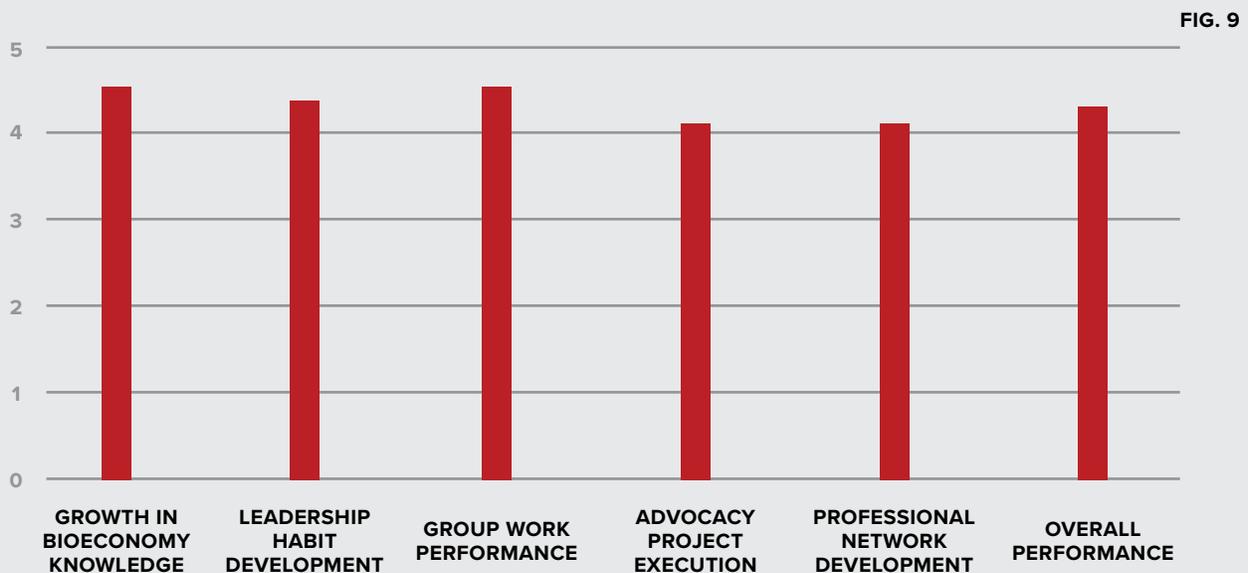
## IMPACTING UNIVERSITY FACULTY

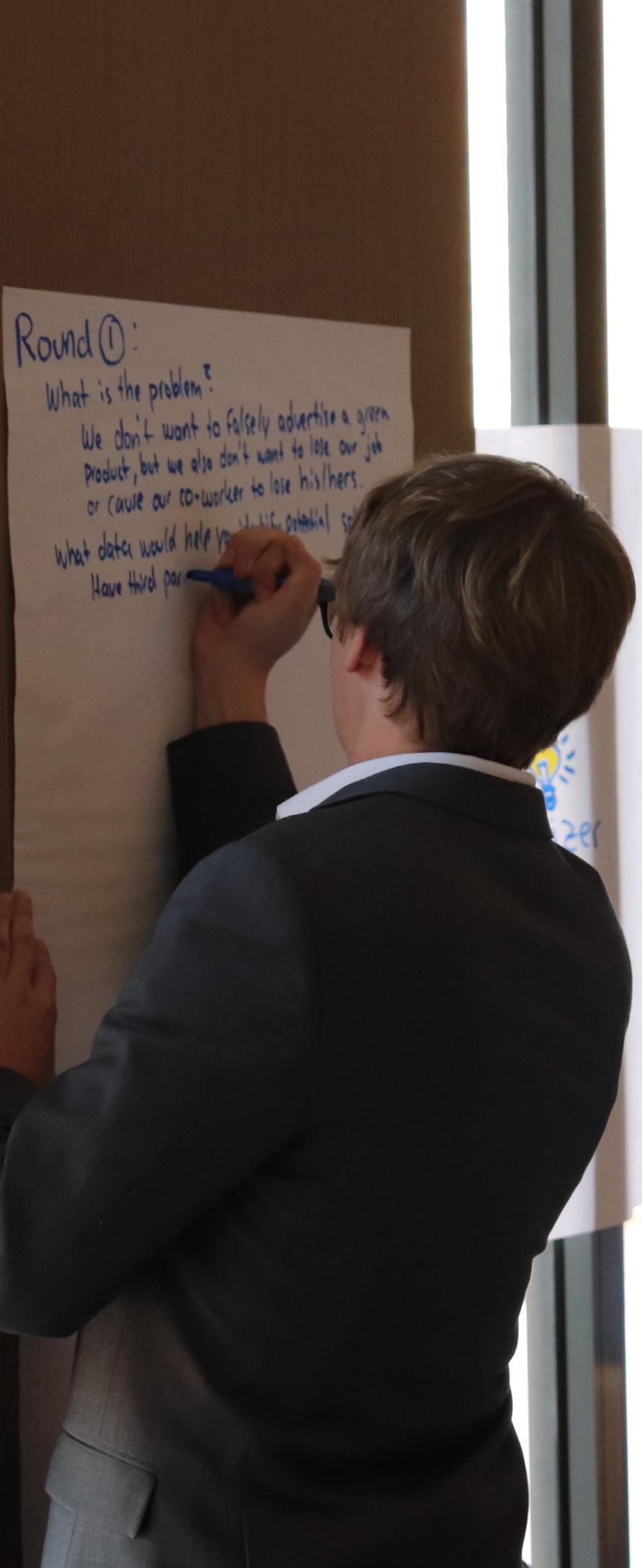
University faculty are the keystone of the CABLE program. From selecting promising student delegates to providing bioeconomy content expertise and intensive mentoring, faculty have substantial impact on CABLE students. The quantitative and qualitative data clearly demonstrate noteworthy results in this regard. CABLE students in cohort one and two evidenced high levels of satisfaction with their own faculty mentors and also noted that the mentoring they received from faculty at other CABLE institutions was important to them.

In addition to mentoring CABLE students, faculty have provided ongoing feedback to the external evaluator as part of the program's continuous improvement process and sustainability planning. Overall, faculty expressed high degrees of satisfaction with the program, both as it relates to their students' growth and to their own professional development.

When asked about CABLE's impact on students, the most prominent theme to emerge was the noteworthy development of students' leadership dispositions and skills, including their improved self-confidence, public speaking abilities, project management skills, overall accountability, and professional networking.

These qualitative findings are substantiated by faculty responses to surveys that were administered at the conclusion of each academic year. As illustrated in Figure 9, faculty considered the CABLE program to have had highly positive impact on participating students in all of the areas that emerged through the qualitative findings.





Round ①:

What is the problem?

We don't want to falsely advertise a green product, but we also don't want to lose our job or cause our co-worker to lose his/hers.

What data would help you identify potential solutions?  
Have third party

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*CABLE has impacted me to become a better leader and make sure that I continue to be able to make an impact on others by being the best version of myself. I've learned to focus on excelling in positive attributes about myself rather than the negative. Thank you for everything you've taught me.*

**CABLE Student Delegate**

# CABLE

**A Cadre of Outstanding University Students on Track for Leadership Roles in the Bioeconomy**

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**More information:** [u.osu.edu/cable](http://u.osu.edu/cable)  
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