Writing an Impact Statement

An impact statement:
- Briefly summarizes, in lay terms, the difference your teaching/learning, research/discovery, and extension and outreach/engagement efforts have made.
- States accomplishment and creates strong support for programs.
- Answers the questions... "So what?" and "Who cares?"
- Conveys accomplishments in simple language free of technical jargon.

Audience for impact statements:

Your impact audience is the public: local, state, and federal officials, your peers, external grantors, and industry representatives. Keep in mind that both basic and applied studies have impacts.

Impact statements follow a simple formula:

Note: not every one of the bullet points below is intended to be addressed, these are examples of the types of information to be conveyed in the three sections.

1. Describe the issue or problem statement (relevance) in simple terms appropriate for your principal audience.
   - Why are we doing this teaching/learning, research/discovery, and extension and outreach/engagement program?
   - What needs were expressed?
   - What was the situation/problem, and why was it a problem?
   - What college initiative and/or NIFA planned program is addressed?

2. Provide an action statement (response).
   - What did you do?
   - What were the key elements?
   - Who was the target audience?
   - What resources were expended?
   - How was evidence collected to document the impacts (surveys, observation, etc.)?

3. Describe the impact (results).
   - The impact of your works is in the answer to the question "What is the payoff socially, economically, and environmentally?"
   - What happened to the audience as a result of the work described?
     - What knowledge was gained?
     - What skills were increased?
     - What practices/behavior changed? How many people changed?
     - How much money was saved?
     - Were policies changed as a result?
     - What were the end results (quantitative and qualitative)?
   - What was the scope of the impact (campus, regional, statewide, etc.)

   Who was responsible? Your name and contact information, list collaborators or contributors.

<u>**Sample Impacts from Tennessee State University**</u>

<u>New Antiviral Tools from Natural Defensive Molecules in Livestock</u>

Relevance

Viral diseases cause billions of dollars in annual losses to livestock production in the US. In addition to the threat to animals, we have seen the devastating effects when viruses jump from animals to humans as is the case with zoonotic viruses such as SARS and the COVID-19 coronavirus. Despite the magnitude of these problems, there is a lack of effective vaccines and antiviral treatments for veterinary and human uses.

Response

Scientists at Tennessee State University have addressed this issue by searching for antiviral molecules that exist naturally in the wild, especially in livestock animals. These compounds, including those called natural immune interferons, have adapted over time to confront ever-changing viral threats. The TSU scientists centered their search on the omega type of immune interferon from pigs and cattle. These omega types of interferons have received relatively little attention in the search for new weapons to fight viral diseases. Pigs and cattle have a much greater number of omega immune interferons than humans do, and generally show a much greater antiviral activity than the most commonly studied interferon types.

Results

Omega type interferons were isolated from pigs and cattle and refined using bioengineering procedures at Tennessee State University. Several of the interferons have shown superior antiviral activity in laboratory tests. Some of them have broad activity to fight viruses not only in pigs, but potentially in humans as well. In cell and tissue-based tests, several of the new omega interferon molecules have 100 to 1,000 times greater activity than the conventional interferon alpha type. These new interferon molecules are now being released for use in research applications and a process has been initiated for animal tests and antiviral development.

<u>Control of Invasive Insects in Ornamental Crops in the Southern United States</u>

Relevance

The nursery and greenhouse industries are important employers in many rural and underdeveloped communities, providing over 2 million jobs and close to $120 billion dollar impact. Pest and disease damage are the principal sources of nursery industry revenue loss. Invasive pests like imported fire ant and Japanese beetle have government-mandated quarantine programs that require expensive treatments to ship millions of nursery plants.

Response

Research performed at the Tennessee State University Nursery Research Center has developed lower cost control options for invasive pests to benefit nursery growers. New insecticide chemical classes that are reduced-risk for farm labor, the environment, and pollinators are also being tested for effectiveness in nursery pest management and programs

for quarantine pests like Japanese beetle and imported fire ant. New biological control methods also are being developed to lessen the impact of serious nursery quarantine pests like imported fire ant and Japanese beetle.

Results
Costs for Japanese Beetle control were reduced between $109 to $738 per treated acre over existing treatment options in the U.S. Domestic Japanese Beetle Harmonization Plan. For Flatheaded Borer, research supported a 50% reduction in the insecticide rate for flatheaded borer management, cutting grower costs in half and reducing environmental contamination. Additionally, growers are obtaining three years of flatheaded borer protection from a new single drench treatment, which reduces labor 5-fold over traditional trunk spray treatments that are applied twice a year.

Controlling Nursery Insects Without Pesticides

Relevance
Woody ornamental nursery production contributes millions to the United States economy each year. High value deciduous trees such as maple, dogwood, redbud and others are susceptible to a trunk boring beetle known as the flatheaded appletree borer. The flatheaded appletree borer is a major pest that can wipe out entire fields of newly transplanted trees. Currently, the best preventative treatment for flatheaded appletree borer management in newly transplanted nursery and landscape trees includes a soil drench of neonicotinoid class pesticide to protect trunk tissue from borer damage. However, there are concerns about the effects of this chemical class on pollinators as well as the selective pressure that can be placed on flatheaded borer populations if only one pesticide class is used for management.

Response
Research at the Tennessee State University Nursery Research Center observed that the presence of weeds in nursery tree rows resulted in fewer flatheaded appletree borer attacks when compared to tree rows kept clean with herbicides. This observation led to a project using cover crops to protect high value trees from flatheaded appletree borer damage following transplant. In the first year of a two-year test, wheat and crimson clover cover were planted in nursery tree rows based on the knowledge that wheat would be at the proper height to protect the tree trunks by May 1st. The crimson clover was added as a nitrogen source. In the second year, annual ryegrass and crimson clover were planted, again with the knowledge that the ryegrass would reach an appropriate height by May 1st. The second crop combination senesced faster than the wheat and appeared to have been more effective at suppressing summer weeds.

Results
Winter cover crops grown at the base of newly transplanted red maple trees protected them from flatheaded appletree borer damage, while also effectively managing weeds. The presence of the cover crop reduced borer attacks by 95 percent in the first growing season following transplant. The results could be useful for orchards, nurseries, urban landscapes

and agroforestry producers in managing this significant economic pest. Trees grown in the cover crop did have reduced growth, as expected given the competition with the cover crop for water and nutrient resources at the base of the tree. Research is underway to minimize the amount of reduced growth.

Advancing the Detection Technologies of Salmonella in Foods

Relevance
Salmonella is one of the most important foodborne pathogens. Every year, Salmonella is estimated to cause one million illnesses in the United States, with 19,000 hospitalizations and 380 deaths. To reduce the incidence of illnesses caused by Salmonella, advanced detection technology is needed to provide reliable and efficient identification of these pathogens from contaminated foods.

Response
Researchers at Tennessee State University have developed molecular fingerprint and biosensor methods for the detection of Salmonella and other foodborne pathogens in foods. The analytical methods developed in this project have shown promising results as efficient tools for food safety monitoring. The improved time-saving concentration process coupled with the automated biosensor analysis provides an attractive alternative to current methods. The researchers have collaborated with industry to further optimize the developed technologies.

Results
This research has developed a rapid and accurate detection technology to ensure food is free from contamination by pathogenic bacteria. The developed technology is intended for use by regulatory agencies, meat and poultry producers and processors to facilitate the identification of potential food safety fallouts in the processing facilities and final products. With this new technology, the testing time will be significantly reduced from days to a few hours and the cost of tests will be reduced by 50% as compared to current methods.

Developing Efficient Ways to Reduce Foodborne Illnesses

Relevance
Each year in the United States, it is estimated that more than 33 million people become ill as a direct result of foodborne illness. More than 9,000 people die. The cost in lost wages, insurance claims and medical bills amounts to between $7.7 and $23 billion a year. Food safety issues are gaining increasing national attention; they have been the subject of numerous articles in the media and even as themes for TV sitcoms.

Response
Historically, pasteurization and other heat-based methods have been used to reduce the level of harmful contaminants in liquid foods. There has been a growing appreciation for the benefits of using non-heat-based treatments as a greener and more energy-efficient process to treat liquid foods. Also, some micro-organisms are getting resistant to current heat-based treatment techniques. One method is the use of ultraviolet (UV) light (highly energetic photons) to treat beverages to inactivate bacteria, viruses, and spoilage microorganisms.

Results
Research in the Food Safety and Bioprocess Engineering Program at Tennessee State University has been examining new ways to increase the efficiency of ultraviolet light in reducing harmful biological and chemical contaminants in foods. The new and improved technologies developed at TSU have successfully reduced the cost of pasteurization and sterilization by 10 fold. The process is yielding better quality and increased safety of foods. A framework has been developed that will enable the process to be scaled up at an industrial/production level. Once implemented by the food processing industry, this technology will save millions of dollars per year and reduce the risk of foodborne illnesses in liquid foods.

Helping Tennesseans Adopt Healthy Lifestyles

Relevance
Unhealthy eating and physical inactivity are linked to excess weight and obesity. The economic cost of obesity in Tennessee is estimated to be at $2.5 billion and is increasing. In 2015, 1 in 3 Tennessee kids were overweight, and 1 in 5 were obese. The Tennessee Department of Education reports that about 60% of the overweight children between the ages of 5 and 10 have at least one risk factor for heart disease and stroke; and that 25% of this same age group have 2 or more risk factors. Tennessee adults face similar challenges.

Response
The TSU SNAP-Ed Community Nutrition Education Program operates in counties that make up about 40% of the citizens in Tennessee. Utilizing various modes of communication, the program conveys practical usable food resource management skills and life skills necessary to make positive behavior changes. These positive behavior changes include planning a menu, using that menu to prepare a shopping list, making healthy choices while shopping at the grocery, and learning basic cooking skills through cooking demonstrations in order to stretch household food dollars and decrease food insecurity.

Results
Results for the members of the 170,000 households in the program are: Adults:60% ate more fruits; 66.2 ate more vegetables; 50.7% reduced sugary beverages; 70.8% chose healthy meals; 48.1% never run out of food; 65.2% compare price of food; 57.9% identify food on sale; 61% use grocery list. Youth (Grades 3-12)56.7% ate more fruit; 54.2% ate more vegetables; 62.76% reduced sugary beverages; 67.7% increased hours spent on physical activity; 54.5% reduced hours spent watching television