

UNIT REPORT
Research - Final Annual Report
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Research and Economic Development

Start: 07/01/2016

End: 06/30/2017

Reporting Year: 2016-2017

Providing Department: Research

Department/Unit Contact: Francis Otuonye

Mission/Vision/Goal Statement:

Vision: Provide research support for Tennessee Tech University to emerge as a leading university for collaborative-interdisciplinary-innovative-creative-entrepreneur culture driven research and development in solving societal and industry problems of critical importance to workforce and economic development of the Upper Cumberland region and the State of Tennessee. **Mission:** Our mission is three-fold.

- Sponsored and scholastic research: support, inspire, incentivize faculty to pursue sponsored and scholastic research and grow sponsored research program.
- Innovation: develop and inspire innovation and entrepreneurial culture on campus involving students and faculty.
- Economic development: play a support role in economic development of the Upper Cumberland region and the state through research developed in the University.

Research and Economic Development

Start: 07/01/2017

End: 06/30/2018

Reporting Year: 2017-2018

Providing Department: Research

Department/Unit Contact: Francis Otuonye

Mission/Vision/Goal Statement:

Vision: Provide research support that will allow Tennessee Tech University to emerge as a leader in collaborative-interdisciplinary-innovative-creative-entrepreneurial research and development that will help solve societal and industrial problems that are of critical importance to workforce and economic development of the Upper Cumberland region and the State of Tennessee. **Mission:** Our mission is three-fold.

- Sponsored and scholastic research: support, inspire, provide incentives for faculty to pursue sponsored and scholastic research and grow a sponsored research program.
- Innovation: develop and inspire innovation and an entrepreneurial culture of students and faculty on campus.
- Economic development: support economic development of the Upper Cumberland region and the State through research developed at the University.

Goal 1

Define Goal:

Goal 1: Develop and encourage activities to increase extramural funding.

Intended Outcomes / Objectives:

Objective 1.1: Provide initiation grants for individual and interdisciplinary research projects.

Objective 1.2: Provide assistance with proposal preparation.

Objective 1.3: Offer proposal and faculty research development workshops and training.

Goal 1

Progress: Ongoing

Define Goal:

Goal 1: Develop and encourage activities to increase extramural funding.

Intended Outcomes / Objectives:

Objective 1.1: Provide initiation grants for individual and interdisciplinary research projects.

Objective 1.2: Provide assistance with proposal preparation.

Objective 1.3: Offer proposal and faculty research development workshops and training.

Goal 2

Define Goal:

Goal 2: Develop and encourage activities to enhance innovation.

Intended Outcomes / Objectives:

Objective 2.1: Provide initiation grants for innovative ideas that might result in invention disclosures.

Objective 2.2: Provide funding for filing patents and copyrighted materials.

Objective 2.3: Seek opportunities to inform angel investors and venture capitalists of inventions in the University intellectual property portfolio.

Goal 2

Progress: Ongoing

Define Goal:

Goal 2: Develop and encourage activities to enhance innovation.

Intended Outcomes / Objectives:

Objective 2.1: Provide initiation grants for innovative ideas that might result in invention disclosures.

Objective 2.2: Provide funding for filing patents and copyrighted materials.

Objective 2.3: Seek opportunities to inform angel investors and venture capitalists of inventions in the University intellectual property portfolio.

Goal 3

Progress: Ongoing

Define Goal:

Goal 3: Identify activities that could potentially improve the economic environment of the region.

Intended Outcomes / Objectives:

Objective 3.1: Provide support to, and collaborate with, public and private sectors in economic development activities.

Goal 3

Define Goal:

Goal 3: Identify activities that could potentially improve the economic environment of the region.

Intended Outcomes / Objectives:

Objective 3.1: Provide support to, and collaborate with, public and private sectors in economic development activities.

Goal 1 Assessment Tools

Goal/ Outcome/ Objective: Goal 1

Type of Tool: Tracking Spreadsheet

Frequency of Assessment: Annually

Rationale:

Goal 1: Develop and encourage activities to increase extramural funding. **Objective 1.1:** Provide initiation grants for individual and interdisciplinary research projects. **Method of Assessment:** Amount of initiation grants/support provided for research growth. **Objective 1.2:** Provide assistance with proposal preparation. **Method of Assessment:** Track number of

proposals submitted by faculty; administer satisfaction surveys; track value of all proposals submitted. **Objective 1.3:** Offer proposal and faculty research development workshops and training. **Method of Assessment:** Track number of proposal development workshops; administer satisfaction surveys; track number of awards received; total value of awards received.

The target for objective 1.1 was established using the 2016/17 value of \$93K to align with the trend in initiation grants funded.

The target for objective 1.2 was set at five percent above (or 242) the 2016/2017 target of 230 proposals submitted with a corresponding five percent increase in value above (or \$68.6 M) the \$65.3 M in 2016/17 . It is anticipated that the number of proposals submitted will increase with the increase in the number of new faculty members hired.

The target for the number of proposal development workshops (training) in objective 1.3 was increased by five percent, from 6 in 2016/2017 to a value of 7 in 2017/18, because of the need to provide more proposal development workshops (training) to the larger number of new faculty. In addition, the targets for the number of awards received and the value of those awards were increased by five percent from 144 awards to 151 awards with a corresponding value from \$13.8 M to \$14.5 M, respectively for the 2017/18 year.

Goal 1 Assessment Tools

Goal/ Outcome/ Objective: Goal 1

Type of Tool: Tracking Spreadsheet

Frequency of Assessment: Annually

Rationale:

Goal 1: Develop and encourage activities to increase extramural funding. **Objective 1.1:** Provide initiation grants for individual and interdisciplinary research projects. **Method of Assessment:** Amount of initiation grants/support provided for research growth. **Objective 1.2:** Provide assistance with proposal preparation. **Method of Assessment:** Track number of proposals submitted by faculty; administer satisfaction surveys; track value of all proposals submitted; track number of faculty who received proposal preparation assistance. **Objective 1.3:** Offer proposal and faculty research development workshops and training. **Method of Assessment:** Track number of proposal development workshops; administer satisfaction surveys; track number of awards received; total value of awards received.

The target for objective 1.1 was established using the 2015/16 value of \$292K because sponsored program activity is on the upswing, and it is unlikely that more funds will be allocated to increase the amount of initiation grants.

The target for objective 1.2 was set at five percent above the 2015/2016 target of 219 proposals submitted with a corresponding five percent increase in value above the \$62.2M in 2015/16. It is anticipated that the number of proposals submitted will increase with the increase in the number of new faculty members hired.

The target for the number of faculty who will receive proposal preparation assistance in 2016/17 is established at 66, an increase of five percent.

The target for the number of proposal development workshops (training) in objective 1.3 was increased by five percent, from 5 in 2015/2016 to a value of 6 in 2016/17, because of the need to provide more proposal development workshops (training) to the larger number of new faculty. In addition, the targets for the number of awards received and the value of those awards were increased by five percent from 137 awards to 144 awards with a corresponding value from \$13.1 M to \$13.8 M, respectively for the 2016/17 year. Further, a survey was administered to assess the level of interest and satisfaction of the activities undertaken.

Goal 2 Assessment Tools

Goal/ Outcome/ Objective: Goal 2

Type of Tool: Tracking Spreadsheet

Frequency of Assessment: Annually

Rationale:

Goal 2: Develop and encourage activities to enhance innovation. **Objective 2.1:** Provide initiation grants for innovative research projects that might result in invention disclosures. **Method of Assessment:** Track number of inventions disclosed. **Objective 2.2:** Provide funding for filing patents and copyrighted materials. **Method of Assessment:** Track number of inventions disclosed. **Objective 2.3:** Seek opportunities to inform angel investors of intellectual property in TTU portfolio. **Method of Assessment:** Track number of inventions disclosed.

There will be a renewed effort in 2017/18 to convert invention disclosures to patent applications and to license the inventions in our portfolio. The target for 2017/18 is established at 11, a five percent increase over last fiscal year, for the number of inventions disclosed.

Goal 2 Assessment Tools

Goal/ Outcome/ Objective: Goal 2

Type of Tool: Tracking Spreadsheet

Frequency of Assessment: Annually

Rationale:

Goal 2: Develop and encourage activities to enhance innovation. *Objective 2.1:* Provide initiation grants for innovative research projects that might result in invention disclosures. Method of Assessment: Track number of inventions disclosed; track number of provisional patents filed. *Objective 2.2:* Provide funding for filing patents and copyrighted materials. Method of Assessment: Track number of patents and copyrighted materials filed. *Objective 2.3:* Seek opportunities to inform angel investors of intellectual property in TTU portfolio. Method of Assessment: Track number of inventions licensed and/or commercialized.

There will be a renewed effort in 2016/17 to convert invention disclosures to patent applications and to license the inventions in our portfolio. The targets for 2016/17 are established at 10, 6, 2, and 2 for the number of inventions disclosed, number of provisional applications filed, number of patents and copyrights filed, and number of inventions licensed and commercialized, respectively.

Goal 3 Assessment Tools

Goal/ Outcome/ Objective: Goal 3

Type of Tool: Tracking Spreadsheet

Frequency of Assessment: Annually

Rationale:

Goal 3: Identify activities that could potentially improve the economic environment of the region. *Objective 3.1:* Provide support to and collaborate with public and private sectors in economic development activities. Method of Assessment: Track number of economic development activities supported; track number of industry contacts made.

For the 2016/17 academic year, the targets for the number of economic development proposals supported is established at 2, and the number of industrial contacts that will result in funded activity to the University or the community is established at 10.

Goal 3 Assessment Tools

Goal/ Outcome/ Objective: Goal 3

Type of Tool: Tracking Spreadsheet

Frequency of Assessment: Annually

Rationale:

Goal 3: Identify activities that could potentially improve the economic environment of the region. *Objective 3.1:* Provide support to and collaborate with public and private sectors in economic development activities. Method of Assessment: Track number of economic development activities supported; track number of industry contacts made.

For the 2017/18 academic year, the targets for the number of economic development proposals supported will remain at 2 (since a five percent increase would be only marginal), and the number of industrial contacts that will result in funded activity to the University or the community is established at 11, a five percent increase over last fiscal year.

Results Goal 1

Goal/Objective/Outcome Number: Rationale for Goals and Assessments and Results

Results:

The goals match TTU's Flight Plan to enhance research, innovation, and contributions to community and economic development of the Upper Cumberland region. The results are being widely disseminated to the President's Cabinet and members of the Academic Deans Council.

Table 1 (attachment Goal 1 _Table 1_Appendix A) is a summary of external awards for each fiscal year within the last six years. Data for each year of funding are presented in the annual reports that are widely distributed to the University Community and posted on the Research website at the link <https://www.tntech.edu/research/reports/annual-reports>. The

increase in externally sponsored activities is attributed to (a) an increase in federal and state funding for research and creative activities, (b) an increase in the number of faculty submitting proposals to funding agencies, and (c) the support and assistance that faculty have received from the ORED in submitting competitive proposals.

Results

Goal 1 and the corresponding objectives and targets are shown in Table 2.

Table 2. Goal 1--Develop and Encourage Activities to Increase Extramural Funding.

It was determined that since a majority of faculty submitting proposals use the proposal development services provided by the ORED, it is too difficult to track individually; therefore, results for tracking the number of faculty who received proposal preparation assistance have not been reported here. The assessment method for Goal 1, Objective 1.2, corresponding to tracking number of proposals receiving proposal development assistance will be eliminated next fiscal year as has been noted in the Modifications and Continuous Improvement Section.

During the 2016-2017 fiscal year, the Grant Development Manager made presentations to the following faculty groups/classes regarding services provided by the Office of Research, identification of funding opportunities, and proposal development.

- College of Education faculty: August 2016
- EVS 7900: September 2016
- Professional Development Faculty/Staff Lunch: February 2017
- Chemical Engineering graduate course: April 2017
- Faculty Development Showcase Learning about Learning group: April 2017
- EDU 7040: June 2017

In addition, in September 2016, the Senior Coordinator and Grant Development Manager worked with Dr. Haynes's Grant Writing students on their proposal pitches and held the second of two junior faculty meetings (the first was held during the previous fiscal year – June 2016).

A survey was administered to assess the level of interest in and satisfaction with the activities conducted by the ORED, and to measure the impact of the training and other services provided on the number of individual, collaborative, and/or interdisciplinary proposals submitted. Analysis of the qualitative data correlated the level of participation with the level of satisfaction. The responses are very representative of the number of faculty who participated in the events and activities. The responses, comments, and recommendations will be used for modification and improvement of subsequent activities, and replication of the assessed event. The summary results of the survey and recommendations are presented as the attachment titled 2017 Office of Research Annual Survey Key Results.

Overall, faculty have been supported, encouraged, and provided incentives to increase the level of externally sponsored activities. Significant progress has been made as demonstrated by the increase in the amount of sponsored activities, the number of faculty who participate in sponsored activities, and the number of faculty who attended trainings. It is anticipated that the impact of these investments will continue to increase and will enhance TTU's research posture regionally and nationally.

Attachments: Attached Files

[2017 Office of Research Annual Survey Key Results](#)

[Goal 1 Table 1 Appendix A](#)

Results Goal 1

Goal/Objective/Outcome Number: Goal 1

Results:

Table 1 (attachment Goal 1 _Table 1_Appendix A) is a summary of external awards for each fiscal year within the last six years. Data for each year of funding are presented in the annual reports that are widely distributed to the University community and posted on the Research website at the link <https://www.tntech.edu/research/reports/annual-reports>. The increase in the number of initiation grants is due to the increase in the amount of start-up packages funded to initiate faculty projects as, this year, we included other amounts provided to faculty beyond just the Faculty Research Grants. The number of awards received increased this fiscal year because the actual funding from some of last year's awards did not actually come through the university until the 2017-2018 fiscal year.

Results

Goal 1 and the corresponding objectives and targets are shown in Table 2.

Table 2. Goal 1--Develop and Encourage Activities to Increase Extramural Funding.

| | Objective | Methods of Assessment | Frequency | 2016/17 Targets | 2016/17 Results | 2017/18 Targets | 2017/18 Results |
|-----|--|---|-----------|-----------------|-----------------|-----------------|-----------------|
| 1.1 | Provide initiation grants for individual and interdisciplinary research projects | Amount of initiation grants/support provided for research growth | Annually | \$292K | \$93K | \$93K | \$217K |
| 1.2 | Provide assistance with proposal preparation | Track number of proposals submitted by faculty; administer satisfaction surveys | Annually | 230 | 205 | 242 | 185 |
| | | Track value of proposals submitted | Annually | \$65.3M | \$52.4M | \$68.6M | \$52.3M |
| 1.3 | Offer proposal and faculty research development workshops and training | Track number of proposal development workshops; administer satisfaction surveys | Annually | 6 | 7 | 7 | 8 |
| | | Track number of awards received | Annually | 144 | 153 | 151 | 173 |
| | | Total value of awards received | Annually | \$13.8M | \$16.9M | \$14.5M | \$16.3M |

During the 2017-2018 fiscal year, the Grant Development Manager made presentations to the following faculty groups/classes regarding services provided by the Office of Research, identification of funding opportunities, and proposal development.

- College of Education Retreat, August 23, 2017
- EDU 7000, November 7, 2017
- EVS 7900, February 12, 2018
- Biology Graduate Student Society (BGSS) Meeting, April 2, 2018
- EDU 7040, June 7, 2018
- Rural Innovation Conference, June 7, 2018
- SPIN/grants.gov training, September 13 and 14, 2017

This year, as its satisfaction survey, the Office of Research developed a list of the following three questions to determine how the Office could improve its functions:

1. How can we improve the services and/or resources currently offered by the Office of Research?
2. What additional services and/or resources can be offered to enhance and support your scholarship efforts?
3. Within the guidelines provided by funding agencies and Tennessee Tech policies, what suggestions do you have regarding ways to streamline our processes?

A link was sent to the faculty via a listserv on April 20, 2018. Reminders were sent on April 27 and May 3. The link was also provided in the Office of Research e-newsletter sent April 30. Faculty were given a two-week window of time to complete the survey. One-hundred eighteen individuals began the survey and 52 completed it. The responses, comments, and recommendations will be used for modification and improvement of subsequent activities, and replication of the assessed event. The summary of the comments is presented as the attachment titled "Summary of Suggestions 2018_Results Goal 1."

Overall, faculty have been supported, encouraged, and provided incentives to increase the level of externally sponsored activities. It is anticipated that the impact of these investments will continue to increase and will enhance TTU's research posture regionally and nationally.

Attachments:

Attached Files

[📄 Summary of suggestions 2018_Results Goal 1.pdf](#)

[📄 Goal 1 Table 1 Appendix A.pdf](#)

Results Goal 2

Goal/Objective/Outcome Number: Goal 2

Results:

Rationale for Goals, Assessments, and the Process of Data Analysis

The goals match TTU's Flight Plan to enhance research, innovation, and contributions to community and economic development of the Upper Cumberland region. The results are being widely disseminated to the President's Cabinet and members of the Academic Deans Council.

Results

Results of intellectual property activity since 2012/13 are provided in Table 1. During the 2016/17 academic year, the number of disclosures decreased from 15 to 8, and the number of provisional applications decreased from 6 to 3. There were no patents filed or inventions licensed and/or commercialized, but there was one copyright filed (see Table 2).

Table 1. Historical Intellectual Property Activity.

Table 2. Goal 2 -- Develop and Encourage Activities to Enhance Innovation.

Since the ORED is limited in resources to evaluate commercial potential for provisional applications filed, it will be difficult in the future to set targets for number of patents and copyrighted materials filed and number of inventions licensed and/or commercialized. This change is described in the Modifications and Continuous Improvement--Program Changes due to Assessment section.

Results Goal 2

Goal/Objective/Outcome Number: Goal 2

Results:

Results of intellectual property activity since 2013/14 are provided in Table 1. During the 2017/18 academic year, the number of disclosures was seven.

Table 1. Historical Intellectual Property Activity.

| | FY 2013/14 | FY 2014/15 | FY 2015/16 | FY 2016/17 | FY 2017/18 |
|-----------------------|------------|------------|------------|------------|------------|
| Invention Disclosures | 2 | 4 | 15 | 8 | 7 |

The following table shows the performance toward the individual objectives of Goal 2.

Table 2. Goal 2 -- Develop and Encourage Activities to Enhance Innovation.

| | Objective | Methods of Assessment | Frequency | 2017/2018 Targets | 2017/2018 Results |
|-----|--|---------------------------------------|-----------|-------------------|-------------------|
| 2.1 | Provide initiation grants for innovative research projects that might result in invention disclosures. | Track number of inventions disclosed. | Annually | 11 | 7 |
| 2.2 | Provide funding for filing patents and copyrighted materials. | Track number of inventions disclosed. | Annually | 11 | 7 |
| 2.3 | Seek opportunities to inform angel investors of intellectual property in TTU portfolio. | Track number of inventions disclosed. | Annually | 11 | 7 |

Results Goal 3

Goal/Objective/Outcome Number: Goal 3

Results:

Toward the goal of improving the economic environment of the region, approximately 117 industry contacts were made this fiscal year. Results of Goal 3 and corresponding objectives are presented in Table 1. The results provide a guide for establishing the targets for 2018/19.

Table 1. Goal 3 -- Identify Activities that Could Potentially Improve the Economic Environment of the Region.

| | Objective | Methods of Assessment | Frequency | 2017/2018 Targets | 2017/2018 Results |
|-----|---|---|-----------|-------------------|-------------------|
| 3.1 | Provide support to and collaborate with public and private sectors in economic development activities | Track number of economic development activities supported | | 2 | 5 |
| | | Track number of industry contacts made | | 11 | 117 |

Results Goal 3

Goal/Objective/Outcome Number: Goal 3

Results:

Rationale for Goals, Assessments, and the Process of Data Analysis

The goals match TTU's Flight Plan to enhance research, innovation, and contributions to community and economic development of the Upper Cumberland region. The results are being widely disseminated to the President's Cabinet and members of the Academic Deans Council.

Results

Toward the goal of improving the economic environment of the region, the ORED won almost \$600,000 in external funding over a five-year period for a Tennessee Center for Rural Innovation, which will focus on cultivating innovation, advancing high-growth entrepreneurship and developing a high-skilled regional workforce within 44 rural Tennessee counties. Also, approximately 72 industry contacts were made this fiscal year. Results of Goal 3 and corresponding objectives are presented in Table 1. The results provide a guide for establishing the targets for 2017/18.

Table 1. Goal 3 -- Identify Activities that Could Potentially Improve the Economic Environment of the Region.

| | Objective | Methods of Assessment | Frequency | 2016/17 Targets | 2016/17 Results |
|-----|--|---|-----------|-----------------|-----------------|
| 3.1 | Provide support to, and collaborate with public and private sectors in economic development activities | Track number of economic development activities supported | Annually | 2 | 1 |
| | | Track number of industry contacts made | Annually | 10 | 72 |

Modifications and Continuous Improvement -- Program Changes Due to Assessment

Program Changes and Actions due to Results:

The ORED conducted a survey to assess the level of interest and satisfaction in the activities and events that were conducted. The summary results and recommendations are presented in the Goal 1 results section.

New Modifications and Continuing Improvement to Goals/Objectives/Outcomes Item

Program Changes and Actions due to Results:

The ORED conducted a survey to assess the level of interest and satisfaction in the activities and events that were conducted. The summary results are presented in the Goal 1 results section.

Improvements to Assessment Plan

Improvements to Assessment Plan:

Since a majority of faculty submitting proposals use the ORED's proposal development services including budget development assistance, editing, reviewing of proposal against proposal guidelines, and creation of graphics, it is difficult to determine and track which services are used for each proposal. Therefore, in the future, the ORED will only track the number of proposals submitted, administer satisfaction surveys, and track value of all proposals as methods of assessment for Goal 1 (Develop and encourage activities to increase extramural funding), Objective 1.2 (Provide assistance with proposal preparation).

Also, due to a lack of resources to invest in making industry contacts, it is difficult to evaluate the commercial potential of provisional intellectual property applications filed, and therefore, targets cannot be set for number of patents and copyrighted materials filed and number of inventions licensed and/or commercialized.

New Improvement to Assessment Plan Item

Improvements to Assessment Plan:

Goal 1, Objective 1.1, is to provide initiation grants for individual and interdisciplinary research projects. In previous years, the amount provided to faculty outside of Faculty Research Grants was not included. This years' results include funding from sources other than Faculty Research Grants; therefore, the Method of Assessment for Goal 1, Objective 1.1, will change to read "amount of initiation grants/support provided for research growth from Faculty Research Grants and other Office of Research funds."

The Method of Assessment for Goal 3, Objective 3.1, is tracking the number of economic development activities supported and the number of industry contacts made. For the next reporting period, the Method of Assessment will be changed to track the number of projects resulting from industry contacts and the total amount of the contracts. If, from this Method of Assessment, it is shown that this goal is not productive, it will be removed from the official Office of Research goals.