

Self-Study of the Transdisciplinary Areas of Excellence 2013-2016

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I. Introduction

The Transdisciplinary Areas of Excellence (TAE) is an unprecedented initiative at Binghamton University that is reconfiguring the way that faculty interact, develop projects, and engage in the hiring process. It is a unique way to meet the growing need for collaborative, interdisciplinary research. In a review of 30 peer institutions, we found no other initiative that has the same combination of features. The TAE is designed for broad participation and touches all schools and colleges. For an initiative that is only in its fourth year, the scope of participation is substantial; thirty-seven percent of Binghamton faculty are affiliated with the TAE and twenty-nine percent of all research and creative activities at Binghamton reported for 2015-16 are related to a TAE. The TAE faculty affiliates come from all schools and colleges, representing thirty-eight departments within engineering, natural and social sciences, arts and humanities.

One of the most valued aspects of the TAE cited by the participants in this self-study is its ability to foster new collaborations. And based on our analysis, TAE collaborations are producing results. According to 2015-16 faculty annual reports, TAE affiliates are involved in fifty-seven percent of all collaborative projects of two or more faculty and eighty-nine percent of all inter-departmental collaborative projects. The investments made through the TAE seed grants have been more than repaid: \$692,451 allocated to seed grants have generated at least \$2.6M, and if we tracked outcomes more carefully, this return would no doubt be higher.¹ And the value of this investment goes beyond monetary. Seed grant projects are building the reputation of Binghamton.

There are significant projects coming out of each TAE that hold great potential for the University. A \$2.8M award was made from SUNY Expanded Investment and Performance Fund in 2016 to a Smart Energy (SE) group for “Collaborative Research, Development, and Education Initiative in Smart Energy Materials and Energy Efficient Electronic Systems across SUNY.” This award will pay for research and teaching infrastructure that will benefit the University. In Sustainable Communities TAE (SC), a working group has formed to go after a \$3M award from the National Science Foundation to study coupled human and natural systems. A new Human Rights Center is being formed in collaboration with Citizenship, Rights, and Cultural Belonging TAE (CRCB). And Materials and Visual Worlds (MVW) is making the first TAE foray into interdisciplinary undergraduate curriculum through the development of a general education course that integrates art history, design, and materials science through active and inquiry based learning. Finally, Health Sciences TAE (HS) is working on a core research facility to house shared lab space and instrumentation that will be available to anyone on campus with research needs.

The TAE’s reach is facilitated by the multiple ways in which faculty can engage in the initiative—by sitting on the steering committees, naming themselves as an affiliate, coming into the university as a TAE affiliated or core hire, declaring the relation of their work to the TAE in the annual faculty report (as of 2016), or receiving a TAE seed grant. Inclusion and diversity in

¹ This total is an underestimate of sponsored activity resulting from seed grants because it represents only those seed grant award outcomes self-reported one year after seed grants were made, and the seed grant program began in 2013, leaving multiple years subsequent to award reports for the investment to pay off. See the Self-Study Appendix of Tables for itemized lists of reported awards.

participation is an important strength of the TAE; they have been functioning as a flexible configuration of faculty, driven by intellectual commitment to the five broad research areas of the TAE and by the conviction that this structure promotes inspiring, interdisciplinary exchange. Still, more avenues for participation and communication can be constructed.

The TAE initiative is embedded in Binghamton's strategic plan, "The Road Map." It was conceived as a way to focus hiring in an era of substantial growth, designed to lead the university to the premier status it is striving for. Over the past three years, TAE members have been involved in hiring 81 faculty; 60% of the net new faculty hired since the Road Map was enacted, 32% of the total number of faculty hired during this time. The potential of these new recruits is starting to be realized, with much more to be gained in the short and long term. It is crucial that the new hires be engaged and supported by the TAE.

These are some of the outstanding results of the TAE initiative; more will be discussed in detail below. This self-study offers insights into the processes and impacts of the TAE, and suggests recommendations to move the TAE forward.

The objectives of this self-study are:

1. Determine the goals of each TAE, and the TAE program at large.
2. Describe the activities and outcomes of each TAE.
3. Assess the impact of the TAE on the University, based on activities and outcomes in relation to their goals, and the opinions of focus group participants.
4. Develop recommendations for the TAE.

II. Self-Study Methods

The Faculty Senate charged the TAE chairs with the completion of this self-study by the end of Fall 2016 as part of their overall evaluation of the TAE program. The chairs worked with Valerie Imbruce, Assistant Director, Office of Strategic Research Initiatives and Taylor Groo, Masters of Public Administration graduate student intern to complete the self-study.

In order to achieve its objectives, the self-study began with a review of existing documents related to the TAE and semi-structured interviews conducted by Imbruce and Groo with each TAE chair.² Existing documentation consists of seed grant applications, awards made, reports submitted by awarded teams one year after award, records from the Provost's Office,³ and text about the TAE in the *Road Map to Premier*, 2013. After review of these documents and the interviews with chairs, we realized the limitations of existing data to provide a full picture of the TAE's goals, activities, outcomes, and impacts. The first limitation is that the existing records only deal with hiring and seed grants; there are other activities the TAE are involved in, as the Chairs

² Interviews were conducted with Bat-Ami Bar On, June 13; Pam Mischen, June 14; Pam Smart, June 15; Wayne Jones, June 15; and Terry Deak, June 26, 2016. Susan Bane assumed Deak's position of Health Sciences chair in August 2016.

³ Records include a document entitled "Interdisciplinary Areas of Excellence" from fall semester of 2012, a spreadsheet of TAE Hires, and spreadsheets of TAE-related responses to questions about publications, presentations, and scholarship, research and creative activities from faculty reports 2015-16. Also included are 2013-14 and 2014-15 Academic Program and Faculty Development Fund Reports made to the Binghamton Foundation outlining use of TAE funds.

described in their interviews. The second limitation is that the seed grant reports were made one year after award; this time frame is not long enough to gather all outputs associated with the seed grant research. Solicitation for more voluntary reporting from seed grant awardees did not yield enough results to paint a fuller picture of outcomes. We considered using Research Foundation databases to look at external proposals submitted and awarded, but concluded that we could not claim all activity of TAE affiliated faculty as outcomes of the TAE, and there was no way to differentiate TAE affiliated outcomes without asking all affiliated faculty; this approach was clearly out of the scope of the timeframe and resources of this study. However, the next best dataset was the 2015-16 annual faculty reports that, for the first time, include a place for faculty to designate their work as TAE related. This data is summarized below. Finally, the chairs agreed that they consider outputs to be more than the traditional measures of scholarly work that is archived in databases (publications, presentations, conferences, grants). They consider affective attitudes and ideas faculty hold about the TAE to be equally as important as tangible work products.

In order to gain a richer picture of the TAE, within the time frame and resources devoted to this project, we decided to conduct five focus groups organized by level of engagement with the TAE: senior faculty steering committee members, junior faculty steering committee members, TAE affiliated and core hire search chairs, TAE affiliated hires, and TAE affiliates. TAE Chairs committed funds for boxed lunches and solicited participation through open calls to all TAE affiliates, with targeted recruitment to foster a diversity of focus group participants by level of TAE engagement and department. Each focus group was designed to have at least 5 participants, one from each TAE, with no more than 8. Focus groups were held on September 22, 23, 28, 29, and 30, 2016. They lasted between 40-75 minutes. Discussions were recorded on the basis of participants' anonymity, transcribed, and coded in Atlas.ti for data analysis. In total, we had participation of 38 faculty from 20 units, listed below. Lists of participants by TAE affiliation can be seen in Table 1. Finally, an open-ended interview was held with Provost Nieman on October 27, 2016 to gather his perspectives on TAE goals and activities.

A group of people we did not include in this process are faculty who have had no engagement with the TAE. This is because the goals of this study are to understand the nature of the activities and their outcomes of the TAE. Soliciting opinions from non-affiliated faculty could broaden the perspective on the TAE's impacts.

Table 1: Focus Group Participants by TAE

Level of TAE Engagement	CRCB	HS	SC	SE	MVW
Senior Faculty	1	2	2	1	2
Junior Faculty	1	n/a	1	3	2
Chairs of Search Committees	2	1	2	1	2
TAE hires	--	--	2	2	1
Affiliates	1	n/a	1	1	2

List of units represented by self-study participants:

1. Anthropology
2. Art and Design
3. Art History
4. Asian and Asian American Studies

- | | |
|--|--|
| 5. Chemistry | 14. Music |
| 6. Cinema | 15. Nursing |
| 7. Comparative Literature | 16. Philosophy |
| 8. Electrical and Computer Engineering | 17. Physics |
| 9. Economics | 18. Public Administration |
| 10. English | 19. Social Work |
| 11. Geography | 20. Systems Science and Industrial Engineering |
| 12. School of Management | |
| 13. Mechanical Engineering | |

Finally, we used social network analysis (with UCInet) to visualize the collaborative projects of two or more faculty. The data used for this analysis comes from two different datasets. The first dataset is made up of publications and presentations self-reported by faculty in the 2015-16 Binghamton University Annual Faculty Reports. The second dataset are grant proposals awarded and pending that came from the Office of Sponsored Programs at Binghamton University for 2015-16 academic year. This analysis can provide a baseline for years moving forward. The attribute data that was used for analysis include: department, school, and TAE affiliation. TAE affiliates are defined in the network analysis as faculty members who are steering committee members, TAE core or affiliated hires, self-identified affiliates, and/or TAE seed grant recipients.

III. Goals of the TAE

There are five TAE goals outlined in the Road Map. These goals are listed below to form a point of comparison to the goals identified through the self-study. **We found there is consensus that the central goal of the TAE program is to establish collaborations among faculty in order to lead to innovative research projects that address world problems.**

1. Build a critical mass of outstanding faculty in the five areas. The five TAE areas were given the opportunity to be involved in hiring, and this involvement is seen as an incentive by some for participation in the TAE in general. The topics of the TAE themselves, purposely broad, are meant to encourage participation and expansion of the “presence” of the TAE on campus through the numbers of people that could be recruited and captured under the five themes. By focusing hiring in this way, the reputation in selected areas of expertise could grow. The issue of faculty retention surfaced through conversations about the goals of the TAE and by junior faculty members who were either hired as affiliates or chose to participate on steering committees, and saw the TAE as something desirable and unique that could keep them at Binghamton.

2. Enhance research collaboration. Collaboration is an undisputed goal of each TAE. The existence of the TAE made collaboration an interest, and demonstrated skill, that was sought through the hiring process. For the two TAEs with the most humanists involved, CRCB and MVW, this goal also entails another: to shift humanist practices from working alone to working and thinking collaboratively. In this spirit, the work of the TAE is to establish conditions for intellectual conversation and exploration to encourage faculty to work across disciplines, and make the humanities more flexible in their research. Bridging broad gaps from science to humanities is

particularly seen as desirable by some, not all. Collaboration, as a goal, is paramount in SE, CRCB, and HS's explicitly stated goals of working towards a research center.

3. Grow external support for research. External support was not disputed as a goal for any TAE, but its emphasis varies according to the applicability of external funding towards certain disciplines. This is in part a practical position; those from disciplines that don't need much money to complete scholarly publications see an opportunity cost to writing a proposal versus an article. And there are some areas of research in which there is much less funding available than others. Orienting towards important world problems, such as human rights for CRCB, became a way to overcome perceived disciplinary challenges toward funding opportunities, and so hiring a senior level faculty position to start a Human Rights Center became a goal. For the other TAEs, training grants for both undergraduates and graduates are seen as a means to promote collaboration, grow external support, and generate momentum towards larger research goals.

4. Recruit excellent graduate students. Recruitment of graduate students is a Road Map goal for the TAE, but was not discussed in the focus groups as a goal of any TAE. The exception is SC, the only TAE to have a strategic plan, in which the recruitment of students for the MA program in Sustainable Communities is listed as a goal. Several self-study participants realize the potential for the TAE structure to be used to educate and support excellent graduate students. Inter- and transdisciplinary research could attract high quality graduate students, and one faculty member in the humanities noted that he had his best recruiting year last year because of the interdisciplinary work he was engaged in. Federal training grants for graduate students were submitted by faculty involved in SE and HS, but these efforts primarily came out of federal research centers affiliated with the TAE.

5. Create an international reputation for excellence in research. Reputation building is a goal of each TAE, but across various scales. In Health Sciences, building a national reputation was articulated as a goal by a senior member who felt that the University did not have national recognition, even in areas with existing strength. Aiming for international recognition, though, was explicitly stated by two TAEs: SC and MVW.

6. Orient research towards problem solving. The results of the self-study show that orienting research towards contemporary problems is an operational sixth goal for SC, MVW, and CRCB, an additional goal to those listed in the Road Map. For SC, it is the principle by which the committee stands, as their goal is to create sustainable communities. SC senior faculty believe that high impact learning experiences, including problem solving, are crucial to the success of universities and society at large. For MVW and CRCB, this represents a radical shift from the way that many members have developed their research. Orienting towards problem solving leads to the development of theory and applications, and doing so in a transdisciplinary context highlights their hybridity. HS and SE do not discuss problem solving as an explicit goal, arguably they already have this orientation due to the nature of their research themes. Although in SE, at times questions of preferred orientation to applied science through engineering versus basic science have arisen when discussing new hires.

IV. Activities and Outcomes

Each TAE is involved in hiring, administers a seed grant program, and supports various events to discuss research. Each TAE has a unique activity that responds to the needs of the group or the university at large. MVW has an annual seminar series that features high profile guests and includes workshops with graduate students; SC is spearheading a campus-wide effort to design and build a “Living Building” at Nuthatch Hollow; HS has an ad-hoc sub-committee to plan a health sciences core facility; SE is working towards its fourth federal research center; and CRCB is planning a new research center in human rights, has a working group on migration, and a working paper series.

Each of these activities, and the ones listed below, were organized by the TAE steering committees, and supported by monies from the Provost’s Office, the Division of Research, and the Road Map. In 2013, the Provost asked the Binghamton Foundation Board of Directors to support the TAE through the Academic Program and Faculty Development Fund through an annual allocation of \$25,000 per TAE. For 2013-14 and 2014-15, the full \$125,000 was not spent. The explanation given in the reports is the time spent on hiring rather than other activities that would require funds. The TAE also used Round I of Road Map for one-time funding allocations of

Table 2: Self-reported Faculty Engaged in TAE-related Work¹

UNIT	Publishing Faculty	Presenting Faculty	Faculty engaged in research and creative activities	Faculty with funded projects^{2,3}	Total proposals pending
CRCB	10	24	16	8	2
MVW	6	7	14	9	1
HS	16	21	30	20	18
SC	8	14	18	12	0
SE	16	16	24	15	11
TAE not specified	12	9	18	12	10
Total TAE related	68	91	120	76	42
Non-TAE related	270	369	292	225	167
% TAE related of total reported at Binghamton	20%	20%	29%	25%	26%

¹ Data from 2015-16 annual faculty reports made to the Provost’s Office as of Nov 29, 2016. Not all faculty are reporting; 412 are reporting research and creative activities, 460 report presentations, and 338 report publications.

² Includes internal and external sources of funding.

³ Internal funds support 54% of TAE related faculty and 37% of non-TAE related faculty.

\$10,000 in 2013-14 and 2014-15 and base funding for Health Science and Smart Energy to enlarge their seed grant funds. See the Appendix for a breakdown of TAE funding sources.

A list of the steering committee members at the time of this report, the 78 TAE affiliated and 3 core hires made from 2013-2016, and the seed grant outcomes, as reported by awardees one-year after award, are tabulated and presented in appended tables for each TAE.

It is difficult to measure the total academic outputs of the TAE. The most comprehensive data set we have are from the annual faculty reports made to the Provost's Office for 2015-16. For this reporting period, queries were added for TAE related publications, presentations, scholarship, research, and creative activities. Due to the way that the data are entered, any co-authored or other collaborative work between Binghamton faculty has multiple records. For this reason, we present the records for TAE related activity by faculty rather than by project, with the exception of proposals pending. These data, presented in Table 2, show that between 20-29% of Binghamton's faculty is producing TAE related academic work.

[Citizenship, Rights, and Cultural Belonging](#) [see Tables A-1 and A-2 appended]

The Citizenship, Rights, and Cultural Belonging TAE has been meeting regularly during the fall and spring semesters from 2013 to the present time. They have a steering committee of 12 members and maintain a list of an additional 33 affiliates that receive electronic communications from the chair. The TAE represents 15 departments and 2 schools. CRCB has participated in faculty searches which have yielded 11 affiliated faculty. They intended to use an approved core hire requests to fulfill their strategy of starting research centers, one focused on human rights, and while they found two possible candidates to fill this expectation, one declined the position at the last minute due to personal reasons, and the other has been hired (to start AY 2017-18) but declined to take on the responsibility of garnering external funding to start a center upon her arrival. A new strategy to further their research aspirations to bridge human rights scholarship with practitioners is underway.

CRCB has run a seed grant program in 2013 and 2014, yielding 4 projects, supporting eight faculty from 7 departments. According to reports made one year after seed grant awards, this investment of \$39,777 has resulted in 2 external grants totaling \$50,000 as well as scholarly products.

CRCB has focused its attention on fostering research collaborations in two different ways, holding conferences on campus and convening a faculty reading group. In the 2013-2014 academic year, the TAE sponsored an event called "Quick Conversations" which facilitated research conversations among various faculty from different disciplines. In the 2015-16 academic year, the TAE made two \$5,000 awards to groups of faculty for organized workshops. Lubna Chaudhry (Human Development), Anja Karnein (Philosophy) and Mattias Iser (Philosophy) organized a Fall 2015 workshop - Challenges of Structural Injustices. John Cheng (AAAS) and Dale Norwood (History) organized a Spring 2016 workshop - Traffic, Territory, Citizenship. CRCB also offered a co-sponsorship of \$1,000 to IASH Migrations and Borders Symposium (Fall 2015). IASH had received a SUNY Conversations in the Disciplines grant for the Symposium CRCB also co-sponsored \$500 for Anthropology's "Multiracial and Multicultural Europe Workshop." In 2016-17, CRCB established a reading group on migration to bring together scholars with interests in this area.

Finally, CRCB has developed a means to expedite slow publishing times by starting a working paper series that is peer-reviewed by an ad-hoc committee convened by TAE members and self-published, archived, and made digitally available through the Bartle Library. Anyone can submit a paper through this process.

[Material and Visual Worlds](#) [see Tables A-3 and A-4 appended]

The Material and Visual Worlds TAE activities have focused on hiring and seed grants, like the other TAE. Their signature activity is a speaker series. The speaker series hosts 3-4 prominent scholars per term from various fields within the performing arts and humanities. There is a public lecture in the evening followed by an informal workshop the next day on a work in progress that includes graduate student members of the MVW Working Group, to which students apply annually to join. The workshop affords students and faculty the opportunity to work closely with major figures in the field, to establish ongoing relationships both with the guest and with faculty and students across areas on campus. Students develop professional and intellectual experience through the practice of workshopping projects underway. The seminar and workshop increase the reputation of Binghamton by developing a network of prominent scholars and artists. Talks are filmed to form an archive and are being edited for posting on a You Tube channel.

MVW has had members on the search committees of 10 new hires from 10 departments. They have had one core hire of an associate professor in anthropology. MVW has awarded 7 seed grants to 18 faculty in 17 departments.

In 2016, MVW initiated a project to develop a new undergraduate course in the interdisciplinary study of materials that would be cross-listed to fulfill the General Education Laboratory Science or Aesthetics requirement. The project is in partnership with Corning Museum of Glass. A proposal for this course was submitted to the NSF Improving Undergraduate STEM Education program for \$300,000. A Steering Committee member received \$24,950 from National Geographic and \$307,394 from the National Science Foundation for his research on material culture.

[Sustainable Communities](#) [see Tables A-5 and A-6 appended]

The Sustainable Communities TAE is the only TAE to have a strategic plan with goals, activities, and metrics outlined. TAE members have participated on the search committees of 13 new hires. Two were core hires at the associate and full professor levels. The latter was hired to direct the environmental studies program to reinvigorate it. The SC TAE has awarded 7 seed grants to 22 faculty from 12 departments.

SC has a number of signature projects. They are leading the development of the new “Living Building” which will be used as an outdoor research and environmental lab at Nuthatch Hollow. Additionally, the TAE has contributed to the development of a new Sustainable Communities Master’s program, launched with seven students in Fall 2016.

SC has supported conferences, such as one on health equity and hydraulic fracturing which was attended by researchers across the United States and Canada. In the 2014-2015 academic year, the TAE hosted a fall symposium called “Productive Again and Families across the Globe.” SC held a “speed dating” event to promote research collaborations and sponsored an evening with Roseanne Haggerly who is the president and CEO of Community Solutions, an organization whose goal it is to end homelessness.

SC is actively working with staff in the Division of Research to win external sponsorship. The TAE has a funding portfolio with target programs, and has collaborated with Smart Energy TAE members to develop a proposal for NYSERDA's Rev Campus Challenge, it was declined, but this has resulted in spin off proposals. Several TAE members are working on a new research project that will culminate in a proposal to the NSF Couple Natural Human Systems program in November of 2017.

Members of SC sit on the Campus Climate Committee to guide reporting of the university's sustainability indicators to improve national rankings and spur campus sustainability projects. From 2015 to 2016, Binghamton has risen from a rank of 143 to a 95 (1 is the top ranking) in the Sierra Club Cool School list as a result of improved reporting by this committee, increasing the university's national reputation in this area and made the Princeton Green Review List.

Smart Energy [see Tables A-7 and A-8 appended]

The Smart Energy TAE has been involved in hiring and seed grants, as well as various institutional proposals. The SE TAE has awarded 12 seed grants to 22 faculty from 9 departments, totaling an investment of \$191,350.00. This has generated 1 external grant, totaling \$525,941.

SE has participated in searches of 13 new faculty members. The did not have a core hire, but had one senior level hire through the SUNY Empire Innovation Program. They have had two failed searches for a new director for the Center for Autonomous Solar Power; lack of start-up funds at a nationally competitive level has impeded hiring. The TAE is reconsidering future directions for this center.

The TAE is working towards the creation of a new federally funded research center; currently there are three in the field of smart energy. The TAE is using training grant proposals, such as NSF Research Experiences for Undergraduates [funded,~\$300K], Scholarships in STEM [pending,~\$4M], and NSF Research Traineeship [pending,~\$3M], the US Department of Energy Graduate Assistance in Areas of National Need [funded,~\$300K] program, and NYSERDA's Rev Challenge [declined, \$1M] to generate momentum towards this end. in 2016-17, the TAE created a program to sponsor strategic plans from the faculty that will lead to submission of a competitive proposal for a new federal research center.

SE has sponsored seminar series in which 10 nationally prominent researchers were brought onto campus to discuss energy storage. Additionally, in the 2014-15 academic year, SE supported undergraduate research including a student participating in a 9-week summer immersion program in partnership NSF REU program. Lastly, the speaker series this year brought 7 nationally renowned researchers to campus.

Health Sciences [see Tables A-9 and A-10 appended]

The Health Sciences TAE has participated in three types of activities since its inception. TAE members have served on search committees for 26 hires in 13 departments, including positions in the new Pharmacy School. HS has awarded 16 seed grants to 35 faculty from 11 departments. This investment of \$242,587 on 16 seed grants has resulted in 8 external grants totaling \$1,983,418. HS is involved in the design of a core research facility that has been allocated space in the ITC's Center of Excellence Building and has \$200,000 in equipment funding awarded

through the Road Map. TAE members have toured the space, discussed departmental needs, and formed a subcommittee to prioritize equipment purchases for this facility.

In the 2013-14 academic year, HS supported faculty group meetings that discussed scientific topics of interest. Additionally, there was a symposium that highlighted world renowned scientists. Lastly, HS supported Harpur's Ferry EMS conference and provided funds for speakers to travel to the Global Health Research conference which was held on Binghamton's campus. In the 2014-15 academic year, funds were allocated towards a colloquium series in biomedical engineering. This colloquium brought internationally known researchers to campus. Lastly, HS supported the Global Health Conference on campus, which attracted nearly 200 participants.

V. Impact of the TAE on the University

To address the question of the impacts of the outcomes detailed above, we solicited the opinions of TAE participants through focus groups. We did not differentiate impacts by TAE, but rather of the TAE initiative as a whole. The focus groups were not designed to be representative of each TAE, they enabled the generation of a variety of perspectives across the TAE.

The largest impacts of the TAE thus far, as perceived by focus group participants, have been in hiring and the development of collaborative relationships. There was agreement that the TAE affiliated hiring process was fundamentally different than previous hiring processes, and produced different results due to TAE involvement, contributing to the first goal of the TAE. The hiring process was believed to have built a critical mass of outstanding faculty in the five areas.

Focus group participants saw the second largest impact of the TAE to be the enhancement of research collaborations, the second goal of the TAE. Junior faculty made connections with senior mentors and were invited into projects they wouldn't have been, others formed research partnerships with people they don't believe they would have met, and dissertation committees included out-of-department colleagues met through TAE work. Some TAE projects arose out of established intellectual connections between faculty, but these connections were nurtured in new ways, taking new directions.

There has also been progress towards the goal of growing external support. The seed grant investment of \$692,451 has generated at least \$2.6M in external awards. This impact is underestimated. There are other TAE affiliated awards, reported in Table 2 for 2015-16, that could be corroborated with the Research Foundation's databases for award amount, or a more comprehensive reporting could be made by TAE members to understand the scope of awards. For example, one recent award, announced in December 2016, additional to the seed grant outcomes reported to date, doubled the known generated funds of the TAE. A proposal entitled "Collaborative Research, Development, and Education Initiative in Smart Energy Materials and Energy Efficient Electronic Systems across SUNY" submitted to SUNY Expanded Investment and Performance Fund was awarded \$2.8M.

Work towards the last three goals—recruiting excellent graduate students, building an international reputation, and orienting towards applied problem solving—are underway to varying degrees per TAE. These are growth areas for the future years of the TAE.

The perceptions of the impact of the TAE by the focus group participants are summarized below, categorized into five areas to outline the discussion points, tensions, impacts, and

potential impacts of each area. A summary of the main findings for each topic are bulleted for ease of reading.

The Hiring Process

- **The new hires are excellent colleagues that would not have been hired without TAE involvement.**
- **Affiliated hires were initiated by the departments, in conversation with the TAE, and core hires by the TAE.**
- **The integration of TAE members on search committees and the inclusion of the TAE in position descriptions was seen as a strength to some and confusing to others involved in the hiring process; it was handled differently in each search.**

Overall, the senior faculty and search committee chairs believed that the TAE and departments have received excellent hires which have helped close the research gaps that exist on campus. There is consensus among the senior faculty who participated in the focus groups that the university would not have gotten these hires if it were not for the TAE existence or involvement. But it is felt that there needs to be clarification of the differences between core and affiliated hires. The affiliated hires arose from the departments' needs, in conversation with the TAE. The searches were chaired by the department and the TAE was invited to appoint a member on the search committee and meet with candidates. The cores hires, of which three were successful, arose from the TAE and received support from possible home departments before hires were made. The TAE chairs all noted that they learned or had the foresight to match their core hiring requests with departments, and when there were departures from departmental requests, potential candidates were only considered viable if a department was willing to berth them.

Each of the TAEs and departments have had different experiences with this basic hiring process. The search process was notably different than previous searches without the TAE. Most widely agreed is that searches were successful only if they found common ground between a department's and TAE's needs. In every affiliated search, the TAE matched their needs to the departments (not vice versa). Negative experiences with affiliated and core searches can easily be addressed in the future; they deal with clearer communication. For example, one search committee participant, when wearing the TAE hat, found the role to be confusing, and stated she "felt like a third wheel." Others expressed the awkwardness of interviewing candidates whose relationship to themselves, or even to the TAE, was not clear. Others were uncomfortable with the idea that being hired to an "area of excellence" raised the question of the excellence of non-affiliates. From the departmental point of view of one TAE affiliate, even when departments were said to be given the power to deny a core hire, they really did not feel that they had "veto power" and were nervous about how a hire would fit in. In retrospect, this core hire has worked out extremely well, but the process was uncomfortable and without precedent.

Some departments struggled with the wording of the TAE in position descriptions. They claim a TAE is confusing; everyone knows what a research cluster is, but nobody outside of Binghamton knows what the TAE are. The SE TAE handled this by doing away with the term entirely, using the term "Smart Energy" when advertising for positions because it is a more

universal term that everyone will understand. The TAE added another layer of complexity when communicating positions for some respondents.

Another lay of confusion in the role of the TAEs in search processes is the role that the Harpur Dean played in modifying positions after they were drafted by the departments and the TAE, aligning positions to the TAE without consultation with the TAE. The following responses from focus group participants could be in reference to the mismatch that resulted from position modification. Three departments felt that their curricular needs were not taken into consideration in TAE affiliated hires. While the resultant faculty are great researchers, in interesting areas, department members felt this did not help the departments' traditional areas of strength and course offerings. Also, new research methods coming into the department were more expensive and without precedent for support at the departmental level. In another case, one hire was seen as a wonderful addition to the university, but was regretfully placed in a different department, where they could have made a great colleague and teacher in another.

Expectations for TAE Affiliated Hires

- **There is no universal set of expectations for being a TAE affiliated hire; it is differentially understood by TAE participants and the hires themselves.**
- **Candidates saw the TAE as a secondary factor for applying for the position.**
- **Some hires are finding support through the TAE; others do not yet see the personal benefit to participating, but are sympathetic to the initiative.**

There was, and still is, persistent lack of consensus about the expectations for the TAE affiliates, including among the hires themselves. The one clear point of agreement is that hires need to prioritize earning tenure in their departments, and that the TAE should be used to support this priority.

Some search chairs found it awkward to explain what the TAE are or what it means to be an affiliated hire to candidates. However, in most, if not all TAEs, every candidate met with members of the TAE during their campus visit, at which meeting the TAE and the opportunities it could offer affiliated faculty were outlined. While senior faculty believe the TAE to be essential to recruiting good faculty, the means by which the mission of the TAE were communicated and understood by candidates, is uneven. Some felt it was just a CV item; others expressed that there would be support available to hires through the TAE. Generally, junior hires are expected by chairs to be "involved" in the TAE, largely by self-directed means according to their interests, but not at the steering committee levels.

The TAE core and affiliated hires reflected that despite the TAE being viewed by others as a magnet for hires, only one claimed that he applied for the position because of the TAE. The others expressed confusion by the advertisement for the position, being unsure of what the TAE were actually doing by the portrayal on the website, and what the expectations for being an affiliated hire are. Candidates saw the TAE as a secondary factor for applying, after the teaching and subject area expertise called for in the position. After being hired, all but one TAE affiliate was concerned by the discrepancies between tenure requirements and the collaborative nature of the TAE. One affiliated hire realized that she participated in TAE at her own risk, her department was ambivalent at best, possibly unsupportive of her participation. Another found a very supportive relationship with a senior faculty mentor in the TAE, and has figured out how to integrate department and TAE work, and feels the TAE is helping him to reach his tenure goals. Another affiliated hire found a collaborator through the TAE, and with support of a seed grant,

has begun a productive, collaborative teaching and research program. Others do not see exactly how to plug in or what the personal benefit would be to doing so, even if supportive of the idea of the TAE. Although the junior faculty are unsure of how tenure might mesh with TAE related work, they agree that it would not be good for departments to have two sets of tenure standards by TAE affiliation.

Seed Grants

- **Seed grants are seen as a vehicle to collaborative research, geared towards new and junior faculty.**
- **The size of the seed grant is not universally seen as enough incentive to participate.**

The senior faculty steering committee members believe that the seed grants have been fairly successful. The search chairs see the seed grants as beneficial mostly for new faculty, and think that they have been successful in fostering interdisciplinary research. Junior faculty, however, were not universally motivated to apply for seed grants. Two saw the TAE as reinforcing the relevance of their research topics, but that their research would have been the same regardless. Another said that the incentive to write a seed grant and form a collaboration was not enough due to the size of the award. This was agreed upon by both engineering and social science faculty, who suggested that larger awards or course releases to develop collaborations could be better incentives. One seed grant awardee was disappointed the size of the award could not support a graduate student, and wondered if he'd be able to generate enough results from it to leverage into another award. And, the lack of alignment with tenure requirements made the seed grant collaboration seem like "extra work" in a few opinions, especially for fields in which an article can be written for little to no money. There was one junior faculty in the group that was able to leverage her seed grant to apply for an external award, and develop a productive, cross-school collaboration.

Collaboration

- **The TAE assist in creating and sustaining collaborative relationships and intellectual stimulation.**
- **The TAE present the opportunity for mentorship of junior by senior faculty; junior faculty would like to be invited into projects they cannot initiate on their own.**

All of the senior faculty steering committee focus group participants agree that the TAE assist in creating and sustaining collaborative relationships. They help faculty break out of their silos and habits. Faculty are working with others that they normally would not, they cross school lines, and create innovative research. The faculty also feel that being involved with the TAE inform them of what others are doing in terms of research and new innovations. It is agreed that this is an important initiative to be involved with.

The TAE hires see mentorship as critical to navigating TAE participation. This is especially true for the new faculty as they are unsure of what their expectations are and need guidance. One new hire explained that his mentor assists him in moving forward on the tenure track while participating in collaborative research that is aligned with a TAE. Other new hires agree that this mentorship is a good model to follow and should be extended to all new hires. They felt the TAE are a great initiative, but are concerned about the way they use their time, especially in

departments where TAE are viewed as detractors from departmental initiatives. TAE hires understand collaboration to be key to TAE success, but see time constraints, the de-centralized nature of the university, and the varied course schedules between schools to be barriers. The skepticism about TAE being a valid use of time held by some hires was shared by search chairs who struggled with how to portray the TAE as attractive, rather than an added burden of work.

The junior faculty agree that they became affiliated with the TAE for research collaboration and intellectual stimulation with other faculty across campus. They also feel a responsibility to promote TAE activities. All of the junior faculty agree that it is beneficial to meet new people and the TAE facilitate that in a way that would not otherwise exist. About half of the junior faculty joined on their own, and the other half were invited and felt obligated to honor their relationship with a senior faculty member despite the TAE being a large time commitment.

Fostering Transdisciplinarity

- **Leadership is seen as an important factor of the success of the TAE.**
- **Curricular structures can be barriers to transdisciplinary research.**
- **New affiliated hires would like to see more resources devoted to the TAE because they believe that transdisciplinarity is the future of higher education; without strong incentives, they worry about the TAE ability to retain promising faculty.**

Leadership is seen as an important factor of the success of the TAE. The chairs set the tone, work flow, and direct the outputs of the TAE. Delegation of tasks, promotion of projects, recruitment of new members is critical work of the chairs. Two TAE have had a turn-over of chairs; the other three are considering successors for next year. It's not an easy role because of the effort involved, with no compensation.

Curricular structures can be barriers to transdisciplinary research. Some TAE participants who believe and want to model transdisciplinary research to their students are frustrated because departmental requirements preclude students from taking many (or any) courses outside of the department. This seems contradictory to the university's promotion of transdisciplinary work. Others worry that departmental plans for a new master's programs would not fit with TAE affiliated hires, opening the question of how the department would meet both needs. Because research and teaching are intertwined, teaching transdisciplinary thinking to students is seen as a logical extension of the TAE.

Some observe that successful TAE are the result of configurations of faculty that had a previous relationship before the TAE came to be. Some new faculty see the TAE as continuation of past work, or work already taking place regardless of the TAE, and question its utility in adding value, especially since they control relatively little resources across the university. New hires had the impression that TAE would have more influence than they actually do, and would like to see more resources devoted to them because they believe that transdisciplinarity is the future of higher education.

New hires that are very sympathetic and involved in the TAE worry about the TAE ability to retain promising faculty. One new hire noted that productive, collaborative relationships to be key to retention since you can't take people and networks with you to another institution. The focus on single authored work can be a deterrent to retention since this work may leave little investment in the actual institution. Three other new hires, including the core hires, want to see

the TAE as an established orientation to higher education, not one that is on the margin or fighting for survival.

VI. Quantifying and Visualizing Collaboration at Binghamton University

Collaboration is a goal of the TAE and was emphasized as a primary motivating factor for many to be involved in the initiative. We performed a network analysis to address the questions of how many faculty, from what departments, are conducting collaborative and inter-departmental research at Binghamton? Do the TAE play a significant role in inter-departmental collaboration? Our analysis can provide a baseline to measure change in collaboration over time as a result of further investment in the TAE.

We found that the TAE are heavily represented in the collaborative work at Binghamton. We found that there are 232 total collaborative projects in the 2015-16 academic year, and that 20% of all faculty (N=1008), from 67% of all departments (N=51) and all schools and colleges (except Pharmacy), are participating in collaborative research. Of these collaborations, 45% are within departments, and 55% between departments; with 89% of the inter-departmental collaborations having at least one TAE affiliated member (see Figure 1, appended) and 57% of all collaborations (within or between departments) being TAE affiliates (see Figure 2, appended). TAE affiliates and non-affiliates do collaborate, showing there is not segregation of work by TAE affiliation (see Figure 3, appended).

We also found that very few collaborative projects are outside of the influence of Harpur or Watson (see Figure 2). There is high density of collaborative ties connecting chemistry, psychology, physics, nursing, mechanical engineering, electrical and computer engineering, systems science and industrial engineering, with other departments (see Figure 4, appended). Likewise, there are few departments with four or more TAE affiliated faculty participating in inter-departmental collaborative projects. Of Watson, the departments are: systems science and industrial engineering, electrical and computer engineering, and mechanical engineering. Of Harpur, the departments are: chemistry, psychology, and physics (see Figure 5, appended).

There is much potential to bring faculty from new departments into collaborative projects through the TAE. A trend to look for in the future is how the disciplinary representation of the TAE is reflected in future collaborative projects, and how the TAE can intentionally design activities to foster a larger culture of collaboration.

VII. Recommendations for the Future of the TAE

These recommendations emerged from the focus groups and interviews, as well as from the preparers' observations made throughout the self-study. Focus group participants agreed it was important to reflect on the TAE to inform the creation of a sixth TAE, and to move forward as a whole.

- 1. Develop more communication, internally and externally, about the TAE.** The TAE have put all disciplines on the same playing field, merging areas with very different values, epistemologies, and work habits. Creating clear ways of talking about the TAE and hosting

TAE events are critical to develop internal and external understanding. Communication staff are present at every steering committee meeting, but it is the burden of the steering committee to organize intellectual exchange and marketing, which is a heavy lift and needs more support, such as a student communications intern. The website should reflect current activities and outcomes of each TAE. A common non-teaching hour built into the course schedule could accommodate more cross-school participation; currently scheduling is difficult.

2. **Clarify expectations for affiliated hires.** There is mixed messaging for new, affiliated hires to engage in interdisciplinary research but also reach tenure before fully participating in the TAE. The two goals are not compatible for some departments. For others, there are hires who want to participate more but fear that it will take away from their “real” work towards tenure. The opportunities and incentives to participate in the TAE needs to be outlined to retain new hires that believe in the TAE, and should be tailored to the needs of each TAE.
3. **Involve graduate students and curricular initiatives at the undergraduate and graduate levels.** The PhDs produced by Binghamton should reflect the innovative work possible through the TAE and could make Binghamton graduates unique. A TAE fellowship and a rethinking of curriculum to enable graduate student participation in the TAE are two possibilities. Because teaching and research are so intertwined for many faculty, developing coursework is a natural extension of the TAE.
4. **Maintain flexibility in the “areas of excellence.”** Areas of excellence need to be agile, to change with participants’ interests and opportunities presented by external drivers. Too much structure can make the TAE inflexible to a fault. It was suggested by at least one person in every focus group that the TAE needs to continually discuss directions for their efforts and activities. About half of the faculty feel that there should be more avenues and incentives for people to be involved in the TAE. The research themes addressed across each TAE should encourage participation from all areas of campus.
5. **Stronger and more tailored incentives for participation.** The amount of the seed grants warrants discussion; they are seen to be too low for the sciences and engineering. The amounts should reflect the needs of each TAE rather than be set across the TAE. The chairs need support. Course releases or stipends might be fair compensation; it should be negotiated on an individual basis with similar offers made to each chair. The TAE hires believe that there should be more resources devoted to the TAE as a sign of increased investment in the TAE structure that would appeal to faculty who are attracted to transdisciplinary work; senior faculty assigned as mentors to incoming faculty could be a source of support.
6. **Set clear goals and metrics for achieving them for each TAE.** There is general agreement that the TAE are more helpful to some disciplines than others and that each TAE should use different metrics to measure success, according to their goals. Sustainable Communities is the only TAE with a strategic plan. Whereas we are able to identify shared goals through the self-study process, goals for each TAE should be explicitly articulated by each steering

committee and used to set milestones for achievement that all agree on. The results of this self-study can guide future activities and processes of the TAE.

VIII. Concluding Remarks

This self-study has found that there is a wealth of support within the faculty for the TAE. 37% of the faculty at Binghamton are involved in the TAE, with 29% reporting research and creative activities related to the TAE in their 2015-16 annual reports. The investment made by the university in the TAE has been more than paid for by the generation of external funds; and the total we report in sponsored funds is underestimated. We found that the TAE are on-track to reaching the goals set by the Binghamton University Road Map; but that more documentation and communication about the TAE's work needs to occur in order to make the initiative's achievements clear to the university community, and processes more inclusive, efficient, and tailored to changing needs. The TAE have collapsed existing boundaries at this university in a way that many faculty find exhilarating and holds much potential. Binghamton has demonstrated interdisciplinary collaboration outside of the TAE as well as within. In some fields, interdisciplinary collaboration is natural; we found a few departments from the sciences and engineering are highly active in interdisciplinary projects. The TAE, however, present the opportunity for a shared understanding of different methodologies, world views, and bases of knowledge that exist in the disciplines. The development of shared understandings can lead to common languages and the ability to address new questions; this work is occurring in the TAE. We have found that the TAE are not working to dismantle disciplinary boundaries, but to overlap them so that their strengths can be leveraged in solving new problems. It takes sustained interaction by TAE members, concrete projects, stable resources, mutual respect, trust, and the tolerance of risk and ambiguity to realize long term goals that can be achieved by these new configurations of expertise. This self-study provides the first holistic look at the TAE. While it has limitations both in its comprehensiveness and the representation of opinions presented; this can be used to facilitate the discussion of how to move the TAE forward according to the needs of those involved.

TAE Self-Study Appendix

TAE Funding Sources
(not expenditures)

	Smart Energy	Health Sciences	Sustainable Communities	Material and Visual Worlds	Citizenship, Rights and Cultural Belonging
2013-14					
Provost's Funds	25,000	25,000	25,000	25,000	25,000
Road Map Round I: SP 1.10 Base Funding to SE and HS (RM and Div of Res)	30,000	30,000			
Road Map Round I: SP 1.3 Interdisciplinary Research			10,000	10,000	10,000
Road Map Round I: SP1.11 Strategic Targeted Academic Research Support	10,000	10,000	10,000	10,000	10,000
2014-15					
Provost's Funds	25,000	25,000	25,000	25,000	25,000
Road Map Round I: SP 1.10 Base Funding to SE and HS (RM and Div of Res)	65,000	65,000			
Road Map Round I: SP 1.3 Interdisciplinary Research (Yr II)			10,000	10,000	10,000
Road Map Round I: SP1.11 Strategic Targeted Academic Research Support (Yr II)	10,000	10,000	10,000	10,000	10,000
2015-16					
Provost's Funds	25,000	25,000	25,000	25,000	25,000
Road Map Round I: SP 1.10 Base Funding to SE and HS	50,000	50,000			
TOTAL	240,000	240,000	115,000	115,000	115,000

Table A-1: Citizenship, Rights, Cultural Belonging TAE Faculty

Level of Engagement	Name	Department	School
Steering Committee	Bat-Ami Bar On (chair)	Philosophy	Harpur
Steering Committee	Lubna Chaudhry	Human Development	CCPA
Steering Committee	Doug Holmes	Anthropology	Harpur
Steering Committee	John Cheng	Asian and Asian American Studies	Harpur
Steering Committee	David L. Cingranelli	Political Science	Harpur
Steering Committee	Praseeda Gopinath	English	Harpur
Steering Committee	Mattias Iser	Philosophy	Harpur
Steering Committee	Joe Keith	English	Harpur
Steering Committee	Ricardo Lafemont	Political Science	Harpur
Steering Committee	Jay Newberry	Geography	Harpur
Steering Committee	Olga Shvetsova	Political Science	Harpur
Steering Committee	Susan Strehle	English	Harpur
Steering Committee	Susan Wolcott	Economics	Harpur
Steering Committee	Mary Youssef	Arabic	Harpur
Affiliated Hire	Sandra Casanova-Vizcaino	Romance Languages	Harpur
Affiliated Hire	Omid Ghaemmaghami	Classical and Near Eastern Studies	Harpur
Affiliated Hire	Mattias Iser	Philosophy	Harpur
Affiliated Hire	Lior Libman	Judaic Studies	Harpur
Affiliated Hire	Sevnic Turkkan	Comparative Literature	Harpur
Affiliated Hire	Dael Norwood	History	Harpur
Affiliated Hire	Surya Parekh	English	Harpur
Affiliated Hire	Sabina Perrino	Anthropology	Harpur
Affiliated Hire	Shay Rabineau	Judaic Studies	Harpur
Affiliated Hire	Michael Weintraub	Political Science	Harpur
Affiliated Hire	Wan Yu	Geography	Harpur
TAE Affiliate	Dina Danon	Judaic Studies	Harpur
TAE Affiliate	John Frazier	Geography	Harpur

Level of Engagement	Name	Department	School
TAE Affiliate	Heather DeHaan	History	Harpur
TAE Affiliate	Nathaniel Matthews	Africana Studies	Harpur
TAE Affiliate	Nicole Hassoun	Philosophy	Harpur
TAE Affiliate	Anja Karein	Philosophy	Harpur
TAE Affiliate	Jonathan Karp	History	Harpur
TAE Affiliate	Sonja Kim	Asian and Asian American	Harpur
TAE Affiliate	Bryan Kirschen	Romance Languages	Harpur
TAE Affiliate	Michael McDonald	Political Science	Harpur
TAE Affiliate	Jason Moore	Sociology	Harpur
TAE Affiliate	Tony Preus	Philosophy	Harpur
TAE Affiliate	Jean Quataert	History	Harpur
TAE Affiliate	Jessie Reeder	English	Harpur
TAE Affiliate	Anthony Reeves	Philosophy	Harpur
TAE Affiliate	Kent Schull	History	Harpur
TAE Affiliate	Sevinc Turkkan	English	Harpur
TAE Affiliate	Wendy Wall	History	Harpur
TAE Affiliate	Michael Weintraub	Political Science	Harpur
TAE Affiliate	Leigh Ann Wheeler	History	Harpur
TAE Affiliate	Mary Youssef	Classics	Harpur
TAE Affiliate	Lisa Yun	English	Harpur

Table A-2: Citizenship, Rights, Cultural Belonging Seed Grant Awards and Products

Year	Amount (\$)	Title	Investigators	Pubs	Pres	Other
2013-14	10,000	Human Security in Africa: Aids malaria tuberculosis and conflict	Seden Akcinaroglu, Political Science Nicole Hassoun, Philosophy	1 (in progress)	1 (in progress)	Collaboration with economists on 2 different papers The Global Health Impact Index at http://global-health-impact.org/country.php Proposal(s) Intended NSF Interdisciplinary Behavioral and Social Science Research Grant, IBSS Division

2013-14	9,790	Decarceration: Human and community rights	William Martin, Sociology Josh Price, Sociology	1 (book in progress)		Proposal(s) Intended Ford and John D. and Catherine T. MacArthur Foundation, NSF, New York State prisons and communities, Open Society, The Pinkerton Foundation, Robert Sterling Clark Foundation
Year	Amount(\$)	Title	Investigators	Pubs	Pres.	Other
2014-15	9,987	Pakistani Christians: perspective on violence, belonging, and citizenship	Lubna Chaudhry, Human Development Josephine Allen, Social Work		Berghof Foundation for Conflict Studies, Harry Frank Guggenheim Foundation, Social Science Research Council, Spencer Foundation,	Report not submitted
2014-15	10,000	Accessing the Late Ottoman Empire: transliteration and translation of ottoman legal codes dealing with citizenship, rights, and cultural belonging	Kent Schull, History Dina Danon, Judaic Studies Safa Saracoglu, History (University of Pennsylvania)			Proposal(s) Intended The Institute of Turkish Studies, NEH Summer Institute, NEH Scholarly Editions and Translations, NSF Law and Social Sciences Program Proposal(s) Submitted NEH (40,000 awarded) SUNY System Administration (10,000 awarded)
TOTAL	39,777	4 awards	8 faculty from 7 departments & 2 schools 1 (professor from University of Pennsylvania)	2 (in draft)	1	See above

Table A-3: Material and Visual Worlds TAE Faculty

Level of Engagement	Name	Department	School
Steering Committee	Gokhan Ersan	Art and Design	Harpur
Steering Committee	Daniel Davis	Music	Harpur
Steering Committee	Fa-ti Fan	History	Harpur
Steering Committee	Olivia Holmes	English	Harpur
Steering Committee	Randy McGuire	Anthropology	Harpur
Steering Committee	Tom McDonough	Art History	Harpur
Steering Committee	Rosemarie Morewedge	German and Russian Studies	Harpur
Steering Committee	Natalija Mijatovic	Art and Design	Harpur
Steering Committee	Matthew Wolf-Meyer	Anthropology	Harpur
Steering Committee	Mark Poliks	Systems Science and Industrial Engineering	Watson
Steering Committee	Andrew Scholtz	Classical and Near Eastern Studies	Harpur
Steering Committee	Pamela Smart (chair)	Art History	Harpur
Steering Committee	Brian Wall	Cinema	Harpur
Core Hire	Matthew Wolf-Meyer	Anthropology	Harpur
Affiliated Hire	Hillary Becker	Classical and Near Eastern Studies	Harpur
Affiliated Hire	David Bisaha	Theatre	Harpur
Affiliated Hire	Carl Gelderloos	German and Russian Studies	Harpur
Affiliated Hire	Hans Gindlesberger	Art and Design	Harpur
Affiliated Hire	Brendan Hennessey	Romance Languages and Literatures	Harpur
Affiliated Hire	Jeffery Kirkwood	Art History	Harpur
Affiliated Hire	Meg Leja	History	Harpur
Affiliated Hire	Elizabeth Robinson	Classical and Near Eastern Studies	Harpur
Affiliated Hire	Matthew Sanger	Anthropology	Harpur
Affiliated Hire	Bridget Whearty	English	Harpur
Affiliated Hire	Jeanette Patterson	Romance Languages and Literatures	Harpur
Affiliated Hire	Alexandra Cuesta	Cinema	Harpur
TAE Affiliate	Josh Reno	Anthropology	Harpur

Level of Engagement	Name	Department	School
TAE Affiliate	Nancy Appelbaum	History	Harpur
TAE Affiliate	Kevin Hatch	Art History	Harpur
TAE Affiliate	Karen Barzman	Art History	Harpur
TAE Affiliate	Julia Walker	Art History	Harpur
TAE Affiliate	Francis Y Chang	Art and Design	Harpur
TAE Affiliate	John Cheng	Asian and Asian American Studies	Harpur
TAE Affiliate	Nicholas A Kaldis	Asian and Asian American Studies	Harpur
TAE Affiliate	Ariana Gerstien	Cinema	Harpur
TAE Affiliate	Monteith McCollum	Cinema	Harpur
TAE Affiliate	Vincent Grenier	Cinema	Harpur
TAE Affiliate	Tomonari Nishikawa	Cinema	Harpur
TAE Affiliate	Jennifer Stoever	English	Harpur
TAE Affiliate	Monika Mehta	English	Harpur
TAE Affiliate	Christopher Bartlette	Music	Harpur
TAE Affiliate	Paul Schleuse	Music	Harpur
TAE Affiliate	Ruth Van Dyke	Anthropology	Harpur
TAE Affiliate	Neil Christian Pages	German and Russian Studies	Harpur
TAE Affiliate	Harald Zils	German and Russian Studies	Harpur
TAE Affiliate	Jeffrey Becker	Classical and Near Eastern Studies	Harpur
TAE Affiliate	John Starks	Classical and Near Eastern Studies	Harpur
TAE Affiliate	Louis Piper	Physics	Harpur
TAE Affiliate	Robert Guay	Philosophy	Harpur
TAE Affiliate	Valerie Imbruce	Research Division	Research

Table A-4: Material and Visual Worlds Seed Grant Awards and Products

Year	Amount (\$)	Title	Investigators	Pubs	Pres.	Other
2013-14	10,000	The Materiality and Visuality of the Pre-Modern Book: A Case Study	Marilynn Desmond, English & Comparative Literature Tina Chronopoulos, Classics	0	5	Interdisciplinary Workshop (involving faculty, graduate students and undergraduate students from various academic areas) Manuscripts purchased for project now reside in library as a resource for students

						<p>Manuscripts will serve as the basis for course-work for medieval courses, conference on the History of Pre-Modern book organized by CEMERS (Fall 2016)</p> <p>Proposal(s) Intended CEMERS</p> <p>Proposal(s) Submitted NEH Challenge Grant (Unsuccessful)</p>
Year	Amount (\$)	Title	Investigators	Pubs	Pres.	Other
2013-14	10,000	Hidden Images: Revealing the Three-Dimensionality of Film Emulsion	Tomonari Nishikawa, Cinema Peter Huang, Mechanical Engineering			<p>Exhibition at Spool MfG (art space) in development Video Documentation in development</p> <p>Proposal(s) Intended NY foundation for the Arts Fellowship Grant, NSF, Dod</p>
2014-15	10,000	Authority and Materiality in the Vernacular Songbook: From the Medieval Lyric to the Petrarchist Madrigal	Olivia Holmes, English & Medieval Studies Paul Schleuse, Music	1 (book in draft)	1	collection of 23 presentations/papers at CEMERS conference
2014-15	10,000	Visual and Material Negotiations around borders- a case study of sovereignty and provincial identity at the edges of imperial rule	Karen-edis Barzman, Art History Kent Schull, History Richard Lee, Sociology Mark Blumler, Geography			<p>Case study</p> <p>Proposal(s) Intended Lila Wallace-Reader's Digest Special Projects Grant, Turkish Cultural Foundation, Institute of Turkish Studies, National Endowment for the Humanities Summer Institute, Gladys Krieble Delmas Foundation,</p> <p>Proposal(s) Submitted Gladys Krieble Delmas Foundation, SUNY System Administration, NEH</p> <p>Proposal(s) Awarded Gladys Krieble Delmas Foundation (awarded 4,915) SUNY System Administration (awarded 40,000) Report not submitted</p>

Year	Amount (\$)	Title	Investigators	Pubs	Pres.	Other
2015-16; (extended to 2017)	6,723.69	The deep history of pottery in the American southeast:	Matthew Sanger, Anthropology Carl Lipo, Anthropology Junghyun Cho, Mechanical Engineering			Proposal(s) Intended NSF (Various), Wenner Gren (Various) Report not (yet) submitted
2015-16	8,300	The elements behind the material and visual world: an exhibition prototype	Gokhan Ersan, Art and Design Mark Poliks, Systems Science and Industrial Engineering Amy Robbins, Ph.D. Candidate, Anthropology			ARTS410 class field trip to Corning Museum of Glass, Product of class: "exhibition prototype booklet", Possible interdisciplinary/transdisciplinary general education course (satisfy science requirement) Proposal(s) Intended The Sloan Foundation book grant in public understanding of science technology and economics, The Graham Foundation grant in art history conservation and museums, The Getty Foundation online scholarly catalogue initiative, NSF the science technology and society, NSF advancing informal STEM learning, National Endowment for the Humanities collaborative research grant, Corning Inc. Report not (yet) submitted
2015-16	13,000	Experimental Frequencies	Monteith McCollum, Cinema Patrick Madden, Computer Science			Participation in shows and festivals Report not (yet) submitted
TOTAL	68,024	7 awards	16 faculty from 15 departments and 2 schools 1 graduate student	1 (video doc in develop ment) 1 (in draft)	1	See above

Table A-5: Sustainable Communities TAE Faculty

Level of Engagement	Name	Department	School
Steering Committee	Shelly Dionne	Management	SOM
Steering Committee	Joseph Graney	Geological Sciences	Harpur
Steering Committee	Robert Holahan	Environmental Studies	Harpur
Steering Committee	Barry Jones	Economics	Harpur
Steering Committee	Harold Lewis	Systems Science and Industrial Engineering	Watson
Steering Committee	Carl Lipo	Environmental Studies and Anthropology	Harpur
Steering Committee	Stephanie Malmberg	Community and Public Affairs	CCPA
Steering Committee	Pamela Mischen (chair)	Public Administration	CCPA
Steering Committee	Hiroki Sayama	Systems Science and Industrial Engineering	Watson
Steering Committee	Gale Spencer	Nursing	DSON
Steering Committee	Eugene Tettey-Fio	Geography	Harpur
Steering Committee	Weixing Zhu	Biological Sciences	Harpur
Core Hire	Carl Lipo	Environmental Studies and Anthropology	Harpur
Core Hire	Timmy Frazier	Geography	Harpur
Affiliated Hire	Ritam Chaurey	Economics	Harpur
Affiliated Hire	Robyn Cope	Romance Languages	Harpur
Affiliated Hire	Rory Eckardt	Management	SOM
Affiliated Hire	George Homsy	Public Administration	CCPA
Affiliated Hire	Elizabeth Mellin	Community and Public Affairs	CCPA
Affiliated Hire	Jessie Reeder	English	Harpur
Affiliated Hire	Florian Kuhn	Economics	Harpur
Affiliated Hire	Jessica (Hua) Meindi	Biological Sciences	Harpur
Affiliated Hire	Molly Patterson	Geology	Harpur
Affiliated Hire	Kristen Prior	Biology	Harpur
Affiliated Hire	Quisheng Wu	Geography	Harpur
Affiliate Hire	Louisa Holmes	Geography	Harpur
TAE Affiliate	Josephine Allen	Social Work	CCPA

Level of Engagement	Name	Department	School
TAE Affiliate	Elizabeth Anderson	Education	GSE
TAE Affiliate	Richard Andrus	Biological Sciences	Harpur
TAE Affiliate	Susan Appe	Public Administration	CCPA
TAE Affiliate	Serdar Atav	Nursing	DSO
TAE Affiliate	Karen Barzman	Art History	Harpur
TAE Affiliate	Lisa Blitz	Social Work	CCPA
TAE Affiliate	Mark Blumler	Geography	Harpur
TAE Affiliate	Cassandra Bransford	Social Work	CCPA
TAE Affiliate	Sharon Bryant	Nursing	DSO
TAE Affiliate	Carmen Carrion-Flores	Economics	Harpur
TAE Affiliate	George Catalano	Biomedical Engineering	Watson
TAE Affiliate	Sung Hoon Chung	Systems Science and Industrial Engineering	Watson
TAE Affiliate	Chengbin Deng	Geography	Harpur
TAE Affiliate	Mike Elmore	Engineering Design Division	Watson
TAE Affiliate	Kim Evanoski	Social Work	CCPA
TAE Affiliate	Nina Flanagan	Nursing	DSO
TAE Affiliate	Koen Gieskes	Engineering Design Division	Watson
TAE Affiliate	Siobhan Hart	Anthropology	Harpur
TAE Affiliate	Nicole Hassoun	Philosophy	Harpur
TAE Affiliate	Elana Iankova	Management	SOM
TAE Affiliate	Congrui Jin	Mechanical Engineering	Watson
TAE Affiliate	Yvonne Johnston	Nursing	DSO
TAE Affiliate	Suk-Young Kang	Social Work	Watson
TAE Affiliate	Celeste Keefe	Nursing	DSO
TAE Affiliate	Tom Kelly	Management	SOM
TAE Affiliate	Pete Knuepfer	Geological Studies	Harpur
TAE Affiliate	Adam Laats	History and Education	GSE
TAE Affiliate	Naomi Lazarus	Geography	Harpur
TAE Affiliate	Youjung Lee	Social Work	CCPA
TAE Affiliate	Hal Lewis	Systems Science and Industrial Engineering	Watson
TAE Affiliate	Huiyang Li	Systems Science and Industrial Engineering	Watson
TAE Affiliate	Lucky Mason-Williams	Education	GSE
TAE Affiliate	Miria Mazziotti Gillan	English	Harpur
TAE Affiliate	Roy McGrann	Mechanical Engineering	Watson

Level of Engagement	Name	Department	School
TAE Affiliate	Valerie Imbruce	Office of Strategic Research Initiatives	Research Division
TAE Affiliate	Ken McLeod	Entrepreneurship and Innovation	Research Division
TAE Affiliate	Andy Merriwether	Anthropology	Harpur
TAE Affiliate	Christopher Morgan-Knapp	Philosophy	Harpur
TAE Affiliate	Andreas Pape	Economics	Harpur
TAE Affiliate	Sabina Perrino	Anthropology	Harpur
TAE Affiliate	Nick Plavac	Bioengineering	Watson
TAE Affiliate	Judith Quaranta	Nursing	DSON
TAE Affiliate	Johsua Reno	Anthropology	Harpur
TAE Affiliate	Victoria Rizzo	Social Work	CCPA
TAE Affiliate	Nadia Rubaii	Public Administration	CCPA
TAE Affiliate	Myra Sabir	Social Work	CCPA
TAE Affiliate	Nasim Sabounchi	Systems Science and Industrial Engineering	Watson
TAE Affiliate	Hiroki Sayama	Systems Science and Industrial Engineering	Watson
TAE Affiliate	Susan Siebold-Sompson	Nursing	DSON
TAE Affiliate	Tom Sinclair	Public Administration	CCPA
TAE Affiliate	David Sloan Wilson	Biological Sciences and Anthropology	Harpur
TAE Affiliate	Shweta Srinivasan	Management	SOM
TAE Affiliate	C. Roger Westgate	Electrical and Computer Engineering	Watson
TAE Affiliate	Ning Zhou	Electrical and Computer Engineering	Watson

Table A-6: Sustainable Communities Seed Grant Awards and Products

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2013-14	10,000	Healthy multigenerational families: building the knowledge base for grandparents raising grandchildren	Youjun Lee, social work Elizabeth Anderson, education Shawn Berkowitz, geriatrician Laura Bronstein, CCPA Dean Marion Martinez, Superintendent Binghamton City School District	2 published 1 in press 1 revise and resubmit 1 paper under review		Developed an interdisciplinary family-centered program Interprofessional Education (IPE) for Binghamton students Proposals Intended Brookdale Foundation, New York Community Trust, Integrated NSF support promoting interdisciplinary research and Education (INSPIRE), NIH Exploratory/Development Research Grant Award (R21) Proposals Submitted NYS office of Children and family services, NIH exploratory/development research grant award
Year	Amt (\$)	Title	Investigators	Pubs	Pres	Other
2013-14	9,987.50	Local Capacity, State Policy, and the Geology of Natural Gas Drilling	Pam Mischen, Public Administration Tom Sinclair, Public Administration Rob Holohan, Environmental Studies Joseph Graney, Geological Sciences & Environmental Studies Mark Blumberg, Geography and Biology Chen Bin Deng, Geography	4	3	3 conferences attended Proposal(s) Intended The Hydraulic Fracturing Conversation across the Disciplines Conference, Workshop on Water Resource Issues Relating to Unconventional Natural Gas Production, New York Sentinels Meeting Proposal(s) Submitted NSF research coordination network grant: Shale Network Organization, New York State's Cleaner Greener Communities Program, US HUD's capacity building for sustainable communities program, Heinz and threshold foundation
2014-15	10,000	From Vulnerability to Resilience: Developing an evidence-based	Lisa Blitz, Social work Elizabeth Anderson, Education Youjung Lee, Social Work Luann Kida, Broome County Promise Zone	2 in draft	2	Proposal(s) Intended The Brady Educational Fund, SAMHSA, NIH R01, U.S. Office of Juvenile Justice and Juvenile Delinquency Prevention, Dept. of Education, Robert Wood Johnson Foundation,

		partnership model for transforming rural schools	Marguerite Wilson, Human Development			Report not submitted
2014-15	10,000	Mobile-based smart service platform for personalized and adaptive learning	Zhanpeng Jin, Electrical and Computer Engineering Candace Mulcahy, Education Elizabeth Anderson, Education Cassandra Bransford, Social Work Pat Bransford, National Urban Technology Center	Not reported		Proposal(s) Intended Dept. of Education institute of Education Sciences Small Business Innovation Research, NSF cyberlearning and future learning technologies, IES special education research Report not submitted
Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2015-16; extended to 2017	9,976	Examining environmental justice in areas with higher asthma rates in Broome county using GIS mapping	Judith Quaranta, Nursing Elizabeth Anderson, Education Kevin Heard, Geography Luann Kida, Broome County Promise Zone	1 to Department of Education (Declined)	1	A mobile-based online, personalized learning module Proposal(s) Intended NIH, American Lung Association Report not submitted
2015-16	14,930	Neighborhood heritage and sustainable communities: devising measures of sustainability at the local level	Siobhan Hart, Anthropology George Homsy, Public Administration	1 in draft	1	3 seminars with invited guests Proposal(s) Intended NSF cultural anthropology program, National Endowment for the Arts, Wenner-gren Foundation, USDA rural communities program, HUD's biannual transformation initiative: sustainable communities research grant program Proposal(s) Submitted

						Robert wood Johnson foundation interdisciplinary research leaders (declined)
2016-17	15,000	Fungi-activated self-healing concrete for sustainable infrastructure	Congrui Jin, Mechanical Engineering David Davies, Biology	TBD	TBD	Proposal(s) Intended NSF resilient and sustainable infrastructures program, EPA, Environmental Research and Education Foundation Report not (yet) submitted
TOTAL	79,894	7 awards	19 faculty from 12 departments and 5 schools 1 CCPA staff 3 external partners	7 3 in draft 2 under review 1 declined	12	See above

Table A-7: Smart Energy TAE Faculty

Level of Engagement	Name	Department	School
Steering Committee	Peter Borgesen	Systems Science and Industrial Engineering	Watson
Steering Committee	Carmen Carrion-Flores	Economics	Harpur
Steering Committee	Steve Czarnecki	S3IP	Division of Research
Steering Committee	Kanad Ghose	Computer Science	Watson
Steering Committee	Changhong Ke	Mechanical Engineering	Watson
Steering Committee	Wayne Jones (chair)	Chemistry	Harpur
Steering Committee	David Klotzkin	Electrical and Computer Engineering	Watson
Steering Committee	Yu David Liu	Computer Science	Watson
Steering Committee	Jeffery Pietras	Geological Sciences	Harpur
Steering Committee	Jeff Mativetsky	Physics	Harpur
Steering Committee	Sean McGrady	Chemistry/Materials	Harpur
Steering Committee	Louis Piper	Physics	Harpur
Steering Committee	Mark Poliks	Systems Science and Industrial Engineering	Watson
Steering Committee	Daryl Santos	Systems Science and Industrial Engineering	Watson
Steering Committee	Bruce White	Physics	Harpur
Steering Committee	Stan Whittingham	Chemistry and Materials Science	Harpur
Steering Committee	N. Eva Wu	Electrical and Computer Engineering	
Steering Committee	Guangwen Zhou	Mechanical Engineering	Watson
Affiliated Hire	Linke Guo	Electrical and Computer Engineering	Watson
Affiliated Hire	Wei-Cheng Lee	Physics	Harpur
Affiliated Hire	Elena Roxana Margine	Physics	Harpur
Affiliated Hire	Sean Gerard McGrady	Chemistry	Harpur
Affiliated Hire	Alex Nikulin	Geology	Harpur
Affiliated Hire	Julien Panetier	Chemistry	Harpur
Affiliated Hire	David Renfrew	Mathematical Sciences	Harpur
Affiliated Hire	Mo Sha	Computer Science	Watson
Affiliated Hire	Manuel Smeu	Physics	Harpur
Affiliated Hire	Yong Wang	Systems Science and Industrial Engineering	Watson

Level of Engagement	Name	Department	School
Affiliated Hire	Ganggang Xu	Mathematics	Harpur
Affiliated Hire	Xin (Frank) Yong	Mechanical Engineering	Watson
Affiliated Hire	Ziang Zhang	Electrical and Computer Engineering	Watson
Affiliated Hire	Pegor Ayanajian	Physics	Harpur
Affiliated Hire	Yao Liu	Computer Science	Watson
Affiliated Hire	Wei Qiang	Chemistry	Harpur
Affiliated Hire	Richard Shaker	Geography	Harpur
Affiliated Hire	Ning Zhou	Electrical and Computer Engineering	Watson
Affiliated Hire	Aravind Prakash	Computer Science	Watson
TAE Affiliate	Tara Dhakal	Electrical and Computer Engineering	Watson
TAE Affiliate	Scott Hancock	Office of Entrepreneurship and Innovation	Division of Research
TAE Affiliate	Bahgat Sammakia	Mechanical Engineering	Watson
TAE Affiliate	Nikolay G Dimitrov	Chemistry	Harpur
TAE Affiliate	Junghyun Cho	Mechanical Engineering	Watson
TAE Affiliate	Aleshia A Huber	Engineering Librarian	Libraries
TAE Affiliate	Elizabeth A Brown	Libraries	Libraries
TAE Affiliate	Lei Yu	Computer Science	Watson

Table A-8: Smart Energy Seed Grant Awards and Products

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2013-14	15,000	Development of ultrahigh capacity lithium-ion battery anode materials	Jiye (James) Fang, Chemistry Louis Piper, Physics Guangwen Zhou, Mechanical Engineering			Proposals Intended NSF DMR - NSF Energy for Sustainability call, DOE basic energy science, ARPA-E, NYESRDA
2013-14	15,000	Laser-Sintered Nanoparticle-Printed Flexible Energy Storage Devices	Chuan-Jian Zhong, Chemistry Bonggu Shim, Physics	1	5 2 (poster)	3 international meeting abstracts for presentations A few other meeting abstracts presented at local meetings including a talk and a poster

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2013-14	14,950	Tuning Exciton Dynamics in Organic Nanowire-Based Solar Cells	Jeffrey Mativetsky, physics Joon Jang, Physics Alistair Lees, Chemistry	2	3 (poster) 2 (colloquium) 8 (local)	<p>Proposals Intended: NSF, DoE, DoD, NYSERDA, collaboration with Lockheed Martin, Proposal(s) submitted: NSF-CCMI</p> <p>1 conference attended 1 top poster award received</p> <p>Proposal Intended NSF CAREER program, Dreyfus Postdoctoral Program in Environmental Chemistry, ACS Petroleum Research Fund Doctoral New Investigator Research Grant, Air Force</p> <p>Proposal(s) submitted NSF Career: Charge photogeneration and transport in organic semiconductor nanowires</p> <p>Proposal(s) Awarded NSF Career: Charge photogeneration and transport in organic semiconductor nanowires (NSF) (Amount \$525,941)</p>
Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2014-15	20,000	Self-sustaining Power generation from a Bio-solar Panel	Seokheun Choi, Electrical and Computer Engineering Chalres Westgate, Research professor, center for autonomous solar power Gretchen Mahler, Bioengineering	1 (journal article)	1 (conference paper)	<p>Proposal(s) submitted NSF, DoE, USEPA, NYSERDA</p>
2014-15	20,000	A Novel Statistical Analytical cloud approach to	Yu Chen, Electrical and Computer Engineering Aleksy Polunchenko, Mathematical Sciences		1 (conference paper)	Collaboration with The Burns Group Extension of results into a graduate student's Ph.D. dissertation

		autonomous real-time threat detection in modern smart grid networks				Proposal(s) Intended NSF- Cyber Physical Systems, NSF- Sensors and Sensing Systems, NSF- Grant Opportunities for Academic Liaison with Industry with the Burns Group, NSF- Secure and Trustworthy Cyberspace, DoE- Microgrid REsearch Development and System Design Proposal(s) submitted NSF SBIR
2014-15	20,000	Energy Harvesting from Mechanical Vibrations Using Non Linear Resonators for Wireless Sensor Networks:	Sherry Towfighian, Mechanical Engineering Yu Chen, Electrical and Computer Engineering Alok Rastogi, Electrical and Computer Engineering	1 (in draft)	3 (conference papers)	Proposal(s) Intended EPA, GOALI Proposal(s) submitted NSF dynamics control and system diagnostics,
Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2015-16	15,000	Smart Energy Harvesting from Human Breathing for Wearable Body Sensors	Shahrzad Towfighian, Mechanical Engineering Zhangpeng Jin, Electrical and Computer Engineering			Proposal(s) Intended NSF Energy power Control Networks, NSF communications circuit and sensing systems, NIH R21 application to national institute on aging Proposal(s) Submitted National Heart Lung and Blood Association, NIH
2015-16	11,400	A statistical machine learning approach to smart grid load	Ning Zhou, Electrical and Computer Engineering	1 (report)	2 (presentations)	Proposal(s) Intended NYSERDA's Smart Grid Program, NSF Energy power control and networks program, NSF computational and

		forecast based on massive datasets	Zhongfei (Mark) Zhang, Computer Science, Xingye Qiao, Mathematical Science		1 (conference paper)	data enabled science and engineering in mathematical and statistical sciences Proposal(s) Submitted DOE
2015-16	15,000	Hybrid organic-inorganic nanomaterials for photovoltaic and piezoelectric energy harvesting	Jeffrey Mativetsky, Physics Junghyun Cho, Mechanical Engineering	1	3	Proposal(s) Intended Samsung Global Research Outreach Program, NSF Electronics Photonics and Magnetic Devices, collaboration with members of CAMM Proposal(s) Submitted Samsung advanced institute of technology (declined)
Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2016-17	15,000	An active grid-friendly distributed energy system testbed	Ziang Zhang, Electrical and Computer Engineering Yong Wang, Systems Science and Industrial Engineering Ning Zhou, Electrical and Computer Engineering	TBD	TBD	Proposal(s) Intended NSF Building Innovation Capacity, NSF Critical Resilient interdependent infrastructure Systems and Processes, DOE Innovative development in energy related applied science, DOE Network optimized distributed energy systems, DOE building energy efficiency frontiers and Innovation technologies, NYERDA advanced clean power technologies, NYERDA advanced clean power technologies, NYESERDA advanced buildings program, NYESERDA REV Campus Challenge Report not (yet) Submitted

2016-17	15,000	Bio-inspired high-performance easy-to-recycle lithium-ion batteries	Congrui Jin, Mechanical Engineering Stanley Whittingham, Chemistry	TBD	TBD	Proposal(s) Intended DOE Vehicle Technology Office, EPA, NSF Mechanics of materials and structures program, Environmental Research and Education Foundation Report not (yet) submitted
2016-17	15,000	Design and synthesis of multicomponent catalytic nanoparticles	Alexey Kolmogorov, Physics Chun-Jian Zhong, Chemistry	TBD	TBD	Proposal(s) Intended NSF CBET program, DOE Basic sciences program (fuel cells and energy storage), Chemical Catalysis program, Report not (yet) submitted
TOTAL	191,350	12 awards	28 faculty from 8 departments and 2 schools	7 (1 in draft)	30	See above

Table A-9: Health Sciences TAE Faculty

Level of Engagement	Name	Department	School
Steering Committee	Susan Bane (chair)	Chemistry	Harpur
Steering Committee	Subimal Chatterjee	Management	SOM
Steering Committee	Ann Fronczek	Nursing	DSON
Steering Committee	Christof Grewer	Chemistry	Harpur
Steering Committee	Pong-Yu (Peter) Huang	Mechanical Engineering	Watson
Steering Committee	Gary James	Biomedical Anthropology	Harpur
Steering Committee	Zhanpeng Jin	EEC	Watson
Steering Committee	Kanneboyina Nagaraju	Pharmacy	SOPP
Steering Committee	Gail Rattinger	Pharmacy	SOPP
Steering Committee	Victoria Rizzo	Social Work	CCPA
Steering Committee	Karin Sauer	Biological Sciences	Harpur
Steering Committee	Lisa Savage	Psychology	Harpur
Steering Committee	James Sobel	Biological Sciences	Harpur
Steering Committee	Linda Spear	Psychology	Harpur
Steering Committee	Kaiming Ye	Biomedical Engineering	Watson
Steering Committee	Lijun Yin	Computer Science	Watson
Steering Committee	Sang Won Yoon	Systems Science and Industrial Engineering	Watson
Core Hire	N/A		
Affiliated Hire	Abinav Bhushan	Biomedical Engineering	Watson
Affiliated Hire	Karen Beth Bohan	Pharmacy Practice	SOPP
Affiliated Hire	Sung Hoon Chung	Systems Science and Industrial Engineering	Watson
Affiliated Hire	Leon Cosler	Chair, Health Outcomes & Admin Sciences	SOPP
Affiliated Hire	Leon Cui	Management	SOM
Affiliated Hire	Weiying Dai	Computer Science	Watson
Affiliated Hire	Sanjeena Dang	Mathematical Science	Harpur
Affiliated Hire	Alana Gunn	Social Work	CCPA
Affiliated Hire	Anja Karnein	Philosophy	Harpur
Affiliated Hire	Ahyeon Koh	Biomedical Engineering	Watson

Level of Engagement	Name	Department	School
Affiliated Hire	Katherine Maclaren	Anthropology	Harpur
Affiliated Hire	Pavel Masek	Biological Sciences	Harpur
Affiliated Hire	Laura Musselman	Biology	Harpur
Affiliated Hire	Kanneboyina Nagaraju	Pharmacy	SOPP
Affiliated Hire	Nasim Sabouchi	Systems Science and Industrial Engineering	Watson
Affiliated Hire	Sumantra Sarkar	Management	SOM
Affiliated Hire	Zuofeng Shang	Mathematics	Harpur
Affiliated Hire	Suzanne R. Solmaz	Chemistry	Harpur
Affiliated Hire	Yan Wang	Computer Science	Watson
Affiliated Hire	Marvin Diaz	Psychology	Harpur
Affiliated Hire	Howard Chang	Biology	Harpur
Affiliated Hire	Hawn-sik Choi	Economics	Harpur
Affiliated Hire	Emre Demirezen	Management	SOM
Affiliated Hire	Huiyang Li	Systems Science and Industrial Engineering	Watson
TAE Affiliate	n/a	n/a	n/a

Table A-10: Health Sciences Seed Grant Awards and Products

Year	Amt (\$)	Title	Investigators	Pubs	Pres.	Other
2013-14	15,000	A novel mobile human-computer interaction approach based on wearable eye-controlled glasses for assisted living and healthcare	Zhanpeng Jin, Electrical and Computer Engineering & Bioengineering Sarah Laszlo, Psychology & Linguistics	1 2 in draft	2	MS student in bioengineering (funded by the seed grant) has been awarded the Katie C. Root Award for Graduate students and is currently pursuing her Ph.D. in Laszlo's lab Post-doctoral researcher is involved in the seed grant project Provisional patent on the Eye-controlled Google Glass has been filed Proposal(s) Intended HUAWEI Device USA (consumer-grade mobile devices), Google, Samsung Proposal(s) Submitted NSF, Binghamton University Interdisciplinary Collaboration Grant Proposal(s) Awarded Binghamton University Interdisciplinary Collaboration Grant NSF: TWC SBE: Small: Collaborative Brain Password: Exploring A Psychophysiological Approach for Secure User Authentication

Year	Amt (\$)	Title	Investigators	Pubs	Pres	Other
2013-14	10,000	Eating for 100 trillion: the gut microbiome, food additives and metabolic disorders	Gretchen Mahler, Bioengineering Anthony Fiumera, Biology			Proposal(s) Intended NIH, NIOSH, NSF
2013-14	12,000	A new strategy to prevent neuronal glutamate excitotoxicity	Christof Grewer, Chemistry David Werner, Psychology			Proposal(s) Intended NIH NINDS, American Heart Association
2013-14	15,000	Development of Nano delivery system for enhanced treatment of biofilm-related infections	Amber Doiron, Bioengineering Karin Sauer, Biology		1	1 invention disclosure in progress Proposal(s) Intended NIH, Department of Defense, DARPA
2014-15	19,960	Is Atopic Dermatitis a Result of S. Aureus Infection due to Stratum Corneum Lipid Loss?	Guy German, Bioengineering Claudia Marques, Biology	2 3 (dft)		Proposal(s) Intended Department of Defense, NIH, National Exzema Association Proposal(s) Submitted NSF Career: biomechanics and mechanobiology, NSF Biomechanics and mechanobiology,

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2014-15	11,440	A Machine Learning-Based approach for Optimizing the Discovery of Brain-Based Risk Markers for Psychiatric Illness	Vladimir Miskovic, Psychology Brandon Gibb, Psychology Chun-An Chou, Systems Science and Industrial Engineering Hiroki Sayama, Bioengineering		1 conf. paper 1 poster	1 M.S.c Thesis Proposal(s) Intended NIMH RDoC, NIH BD2K, NSF Faculty Early Career Development Program Proposal(s) Submitted NSF, NIH, NSF Proposal(s) Awarded NSF Award (217,970) Report not submitted
2014-15	19,980	Investigating Bacterial Biofilm Formation Toxin Trafficking Using microfluidic Technology	Jeffrey Schertzer, Biology Paul Chiarot, Mechanical Engineering	4	5	Proposal(s) Intended NSF, NIH R21, ICG program Proposal(s) Submitted NSF, NIH R21 Proposal(s) Awarded "(DBI 1426484) NSF Major Research Instrumentation grant (DEVELOPMENT stream). "Development of a Microfluidic Instrument for High-throughput Production of Asymmetric Vesicles to Support Membrane Biology Research". P. Chiarot, PI; J. Schertzer, Co-PI. (\$420,000). Active." Report not submitted

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2014-15	19,220	Design optimization of porous scaffolds for bone regeneration	Ryan Willing, Mechanical Engineering Kaiming Ye, Bioengineering			Proposal(s) Intended NSF (DMREF), NIH, National institute of Biomedical Imaging and Bioengineering, U.S. Army Medical Department- Medical research and Materiel Command, ICG Report not submitted.
2015-16	20,000	Predicting Conversion to psychosis in at-risk youth: the role of stress-inflammation interactions	Gregory Strauss, Psychology Terrence Deak, Psychology Hiroki Sayama, Systems Science and Industrial Engineering Gary James, Anthropology & Nursing			Proposal(s) Intended National Institute of Mental Health Proposal(s) Submitted American Psychology Association, National Institute on Aging, NSF, National Institute for Alcohol Abuse and Alcoholism Proposal(s) Awarded Neuroinflammation and Social Behavior Across the Lifespan (Years2-5, \$935,945.83) 2015 David Wechsler Early Career Grant for Innovative Work in Cognition (\$25,000.00) Report not submitted
2015-16	15,000	Treatment of Parkinson's disease using intranasal delivery via electrospray atomization	Christopher Bishop, Psychology Paul Chiarot, Mechanical Engineering			Proposal(s) Intended NIH, Michael J. Fox Foundation Proposal(s) Submitted "Schick Manufacturing Incorporated, NSF, Michael J Fox Foundation New York University Michigan State University National Institute of Neurological Disorders and Stroke Michael J Fox Foundation Michael J Fox Foundation Michael J Fox Foundation Harvard Medical School" Proposal(s) Awarded Schick Manufacturing Incorporated, NSF (\$59,727.00) – Rpt not yet submitted.

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2015-16	15,000	Real time monitoring of global neurophysiological function using customized 3D printed biosensors and sensor data fusion algorithms	Prahalada Rao, Systems Science and Industrial Engineering Chun-An Chou, Systems Science and Industrial Engineering Vladimir Miskovic, Psychology			<p>Proposal(s) Intended NSF Service Enterprise Systems Program, NSF Smart connected Health Program, DOD congressionally Directed Medical Research Program, Air Force Office of Scientific Research, Defense Advanced Research Projects Agency</p> <p>Proposal(s) Submitted NSF</p> <p>Proposal(s) Awarded NSF Biosensor Data Fusion for Real-time Monitoring of Global Neurophysiological Function (\$222,970.00) Report not submitted</p>
2015-16	9,999	Predicting risk factors for hospital readmissions post discharge from skilled nursing	Nina Flanagan, Nursing Victoria Rizzo, Social Work Gary James, Anthro Adele Mattinat Spegman, Director of Nursing Research, Geisinger Health System			<p>Proposal(s) Intended National Institute of Nursing Research R21 Community Partnerships to Advance Research Exploratory Grant, PCORI</p> <p>Proposal(s) Submitted "Rush University Medical Center, NYS Office of Mental Health, SiMmersion"</p> <p>Proposal(s) Awarded "Rush University Medical Center, NYS Office of Mental Health" (\$76,805.00) Report not submitted</p>

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2016-17	14,988	Assessing the roles of dietary factors and intestinal inflammation on gut permeability in vitro and in vivo	Gretchen Mahler, Biomedical Engineering Laura Musselman, Biology			Proposal(s) Intended NIH, NIOSH, NSF Report not (yet) submitted
2016-17	15,000	Developing pattern recognition coupled with nanostructured sensor arrays for cancer detection	Susan Lu, Systems Science and Industrial Engineering Chuan-Jian Zhong, Chemistry			Proposal(s) Intended Cancer Detection Diagnosis and Treatment Technologies for Global Health, Imaging and Biomarkers for Early Detection of Aggressive Cancer, American Asthma Foundation Research Program Report not (yet) submitted
2016-17	15,000	Dye nanoparticle composites for infrared photodynamic therapy applications	Amber Doiron, Biomedical engineering Wayne Jones, Chemistry William Bernier, ChromaNanoTech LLC			Proposal(s) Intended NIH R21, NIHR01, Department of Defense under U.S. Army Medical Research and Materiel Command Report not (yet) submitted

Year	Amt (\$)	Title	Investigators	Pub	Pres	Other
2016-17	15,000	Integrated flexible sensors for inexpensive at home Ca++ monitoring	David Klotzkin, Electrical and Computer Engineering Seokheun Choi, Electrical and Computer engineering Peter Huang, Mechanical Engineering			Proposal(s) Intended Integrated Flexible Sensors for Inexpensive At-Home Ca++ Monitoring
TOTAL	242,587	16 awards	36 faculty from 17 departments and 3 schools 1 DSON staff 1 external partner	7 5 in draft	9	See above

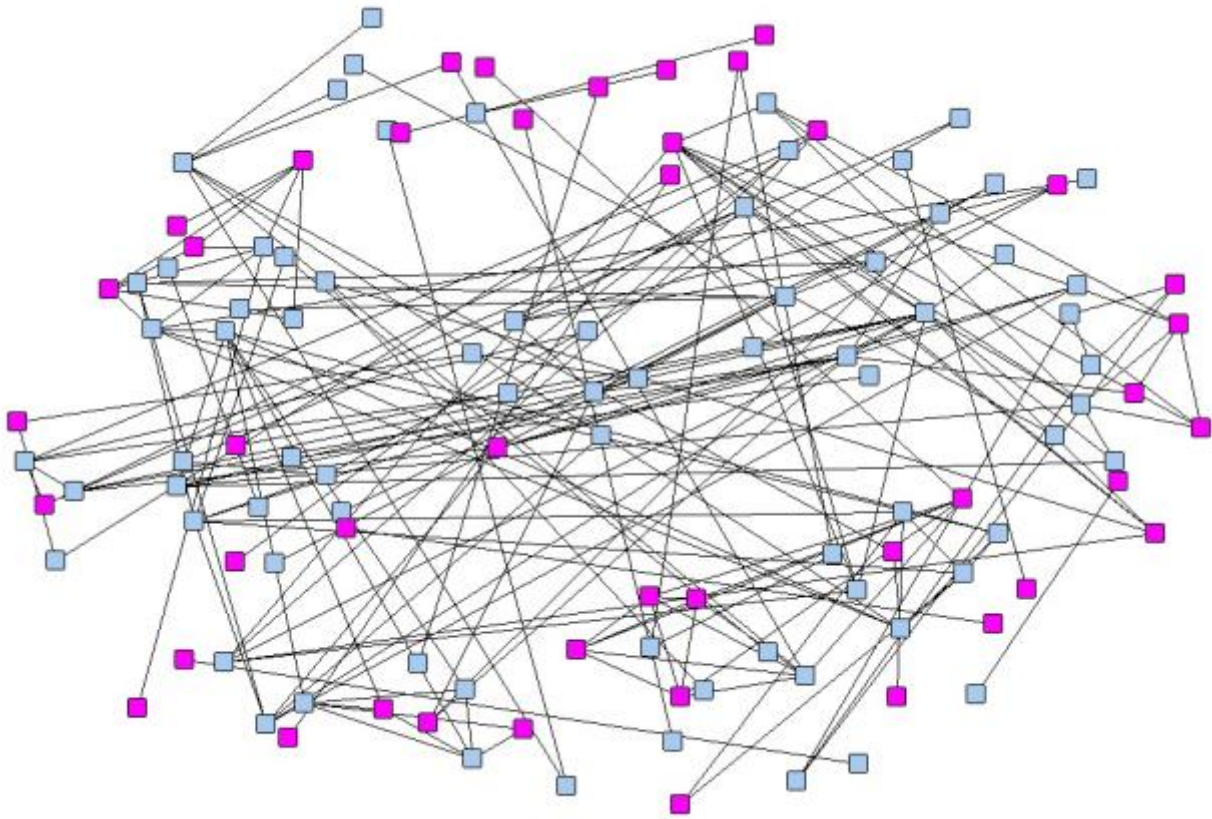


Figure 1: Inter-departmental Collaboration by TAE Affiliation

Blue nodes are affiliated, pink are not

Figure 1 shows *only* faculty members who are participating in inter-departmental collaborative projects, which are 59% of the total collaborative faculty shown in Figs. 1 and 2. **89% of the inter-departmental collaborate groups have a TAE affiliate; it is rare to see inter-departmental work that is not affiliated with a TAE.**

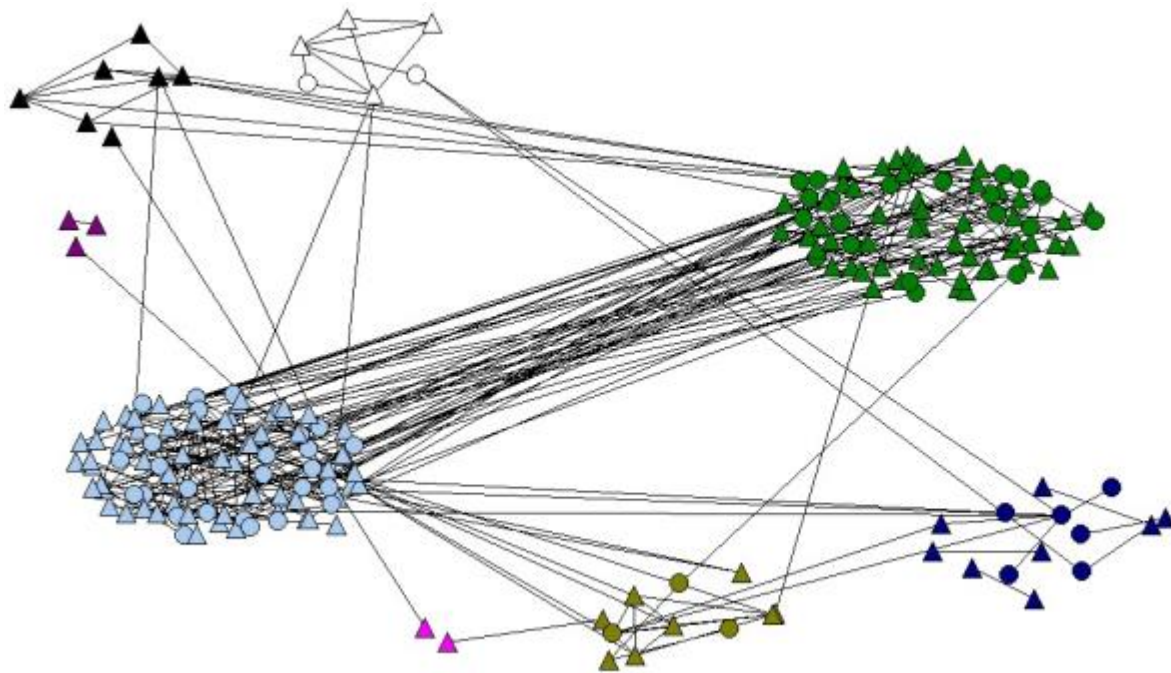


Figure 2: Collaborating Faculty by School or College and TAE affiliation
 Circles represent TAE affiliates; triangles non-affiliates

Color	Unit
Green	Watson School of Engineering
Light Blue	Harpur College
Dark Blue	College of Community and Public Affairs
Olive Green	Decker School of Nursing
Black	School of Management
White	Graduate School of Education
Purple	Libraries
Pink	Administration

Figure 2 shows all of the participating, collaborative faculty grouped and colored by school or College, shaped by TAE affiliation, with ties to collaborators. This shows that all of the schools and colleges (except Pharmacy) at Binghamton University are participating in collaborative projects, and 57% are TAE affiliates. Three units—administration, libraries, and SOM do not have TAE affiliates. **This analysis shows that very few collaborative projects are outside of the influence of either Harpur or Watson.**

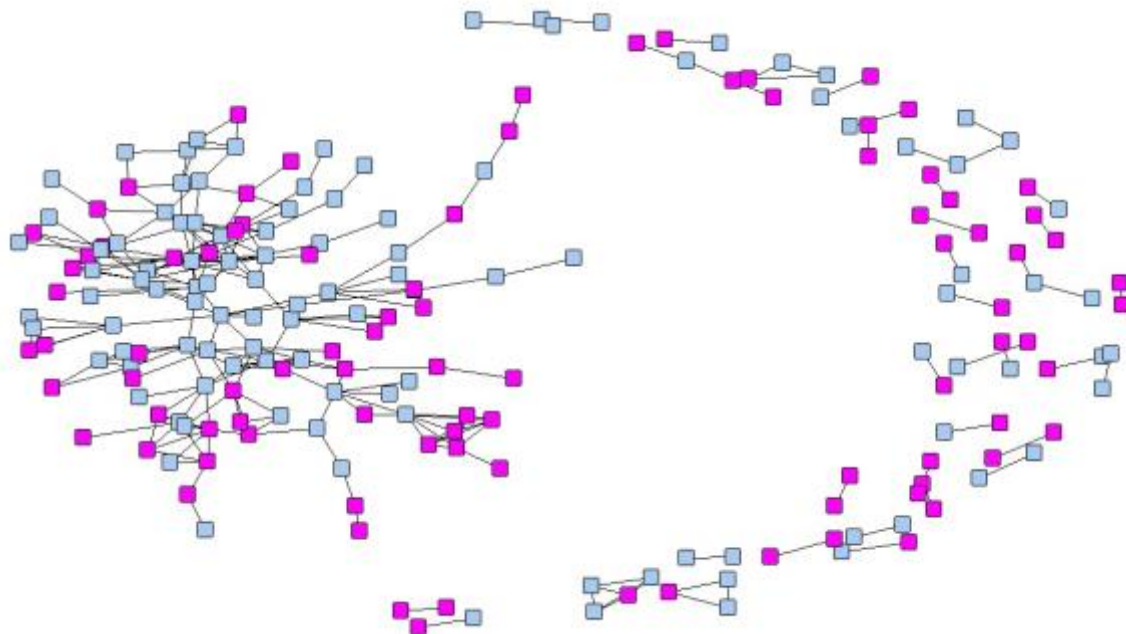


Figure 3: Collaborating faculty by TAE Affiliation

Blue nodes are affiliated, pink are not

Figure 3 shows all of the participating faculty colored by TAE affiliation. Both types of faculty are participating in collaborative projects, not only TAE affiliates. Over half, 57% of the collaborative faculty, are TAE affiliates. The left side of the sociogram depicts one large group—one component—of faculty that are all connected through key actors. This interconnected network makes up 60% of the collaborating faculty. The right side of the sociogram depicts the remaining 40% of collaborating faculty who are in 36 separate components of isolated collaborating groups. **This sociogram illustrates that the TAE affiliates and non-TAE affiliates are interconnected through collaborations; very few are working in isolated components by TAE affiliation.**

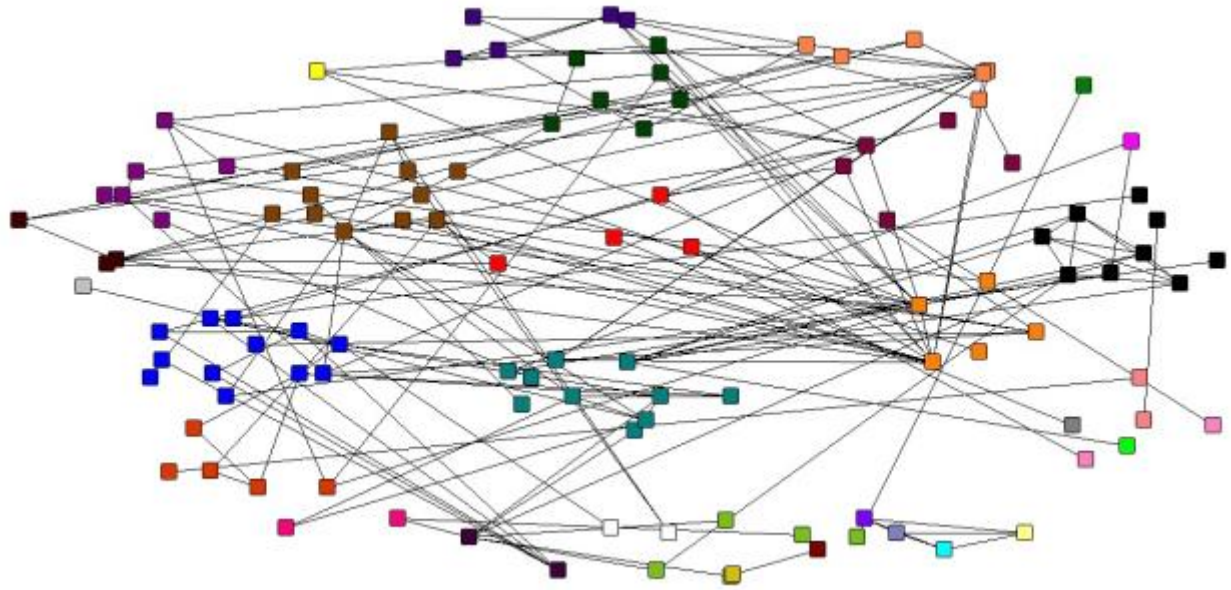


Figure 4: Inter-departmental, Collaborative Faculty

Color	Unit	Color	Unit
Dark Purple	Administration	Cyan	Judaic Studies
Red	Anthropology	Green	Libraries
Light Orange	Biology		Mathematics
Dark Blue	Biomedical Engineering	Dark Green	Mechanical Engineering
Orange	Chemistry	Black	Nursing
Light Purple	Classics	Bright Green	PhD student
Yellow	Comparative Literature	Purple	Physics
Dark Purple	Computer Science	Teal	Psychology
Yellow	Economics	Grey	Public Administration
Pink	Education	Grey	Romance Languages
Brown	Electrical and Computer Engineering	Orange	School of Management
Pink	Geography	Light Green	Social Work
Dark Brown	Geology	Gold	Student Affairs
Light Blue	History	Blue	Systems Science and Industrial Engineering
Brown	Human Development	Bright Pink	Women Gender and Sexuality Studies

Figure 4 shows inter-departmental, collaborative faculty grouped and colored by department. 67% of all departments are participating in collaborative research. Of these represented departments, 89% of them are participating in inter-departmental collaborative research which is depicted in this sociogram. See key for list of departments.

There is high density of ties connecting chemistry, psychology, physics, nursing, mechanical engineering, electrical and computer engineering, systems science and industrial engineering, with other departments. The departments that are found

on the periphery of the sociogram, such as economics, geography, education, and mathematics have few (1-4) connections.

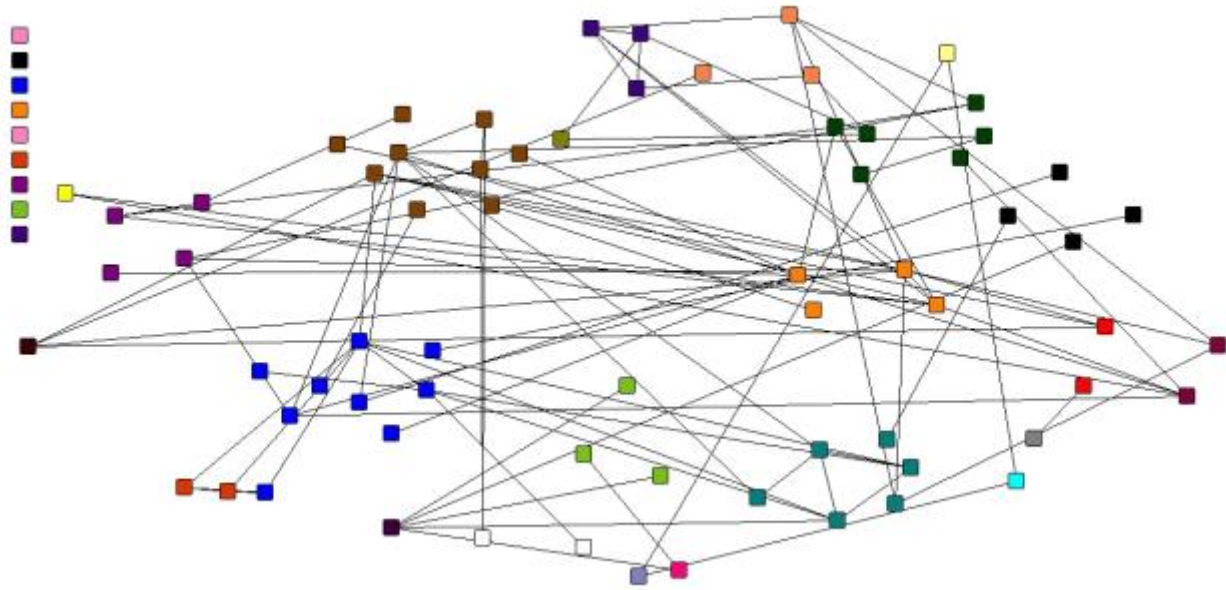


Figure 5: TAE Affiliated Faculty Engaged in Inter-departmental Projects

Color	Unit	Color	Unit
Dark Purple	Administration	Cyan	Judaic Studies
Red	Anthropology	Green	Libraries
Light Orange	Biology	White	Mathematics
Dark Blue	Biomedical Engineering	Dark Green	Mechanical Engineering
Orange	Chemistry	Black	Nursing
Purple	Classics	Bright Green	PhD student
Yellow	Comparative Literature	Purple	Physics
Dark Purple	Computer Science	Teal	Psychology
Yellow	Economics	Grey	Public Administration
Pink	Education	Grey	Romance Languages
Brown	Electrical and Computer Engineering	Orange	School of Management
Pink	Geography	Light Green	Social Work
Dark Brown	Geology	Gold	Student Affairs
Light Blue	History	Blue	Systems Science and Industrial Engineering
Brown	Human Development	Magenta	Women Gender and Sexuality Studies

Figure 5 shows the faculty grouped and colored by department. The faculty here are only those that are TAE affiliates *and* have done inter-departmental projects. The number of connections have decreased. The nodes that do not have any ties (those on the left side) illustrate TAE affiliates partnered with non-TAE affiliates. **There a few departments with 4 or more TAE affiliated faculty participating in inter-departmental collaborative projects. Of Watson, the departments are: systems science and industrial engineering, electrical and computer engineering, and mechanical engineering. Of Harpur, the participating departments are: chemistry, psychology, and physics.** We can infer that the faculty in these departments participate in more inter-departmental collaborative projects than faculty in other departments.

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