Table of Contents

CANR RPT Committee Roster ........................................................................................................... 1
Annual Schedule of RTP Reviews ........................................................................................................ 2
Dean’s Level Expectations .................................................................................................................... 3
  What is an Assistant Professor ........................................................................................................... 3
  What is an Associate Professor ......................................................................................................... 4
  What is a Professor ........................................................................................................................... 5
Strengthening Faculty Scholarship Across the Mission ........................................................................ 6
Faculty Statement on Scholarly Activities, Scholarship, and Impact ............................................... 9
Extension in Reappointment and Promotion Packets: Guidance for CANR Faculty at MSU ........... 12
Elements of a Strong RPT Package ..................................................................................................... 14
  Reappointment to Assistant Professor .............................................................................................. 14
  Promotion to Associate Professor .................................................................................................... 15
  Promotion to Professor .................................................................................................................... 17
Points of Relevance for Junior Faculty ............................................................................................... 18
Principles for Faculty Evaluation ........................................................................................................ 19
CANR Faculty Mentoring Policy .......................................................................................................... 21
Reflective Essay: Perspectives and Guidelines .................................................................................. 23
Example Reflective Essays ................................................................................................................ 27
  Brad Day Reflective Essay (Reappointment & Promotion to Associate) ........................................ 27
  Tariq Abdelhamid Reflective Essay (Reappointment & Promotion to Associate) ....................... 31
  Steve van Nocker Reflective Essay (Promotion to Professor) ........................................................ 38
  Sieglinde Snapp Reflective Essay (Promotion to Professor) ........................................................... 43
  Evangelyn Alocilja Reflective Essay (Promotion to Professor) ....................................................... 51
<table>
<thead>
<tr>
<th>Representative</th>
<th>Unit</th>
<th>Term Expires – August 15</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Cathy Ernst</td>
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Annual Schedule of RTP Reviews

DEPARTMENT-SCHOOL LEVEL

RTP discussions with chair and department-school review committee
Organizing RTP dossiers
Solidation of external reviews (only for 2nd reappt and prof reviews)
Department-and school-level review of RTP candidates
Submission of RTP dossiers to College

Spring-Summer
Summer-early Fall
Summer-early Fall
Middle-late Fall
2nd Fri in December

COLLEGE LEVEL

(To go into effect Fall 2011: Preliminary presentation of RTP candidates by CANR chairs and directors to Dean and Directors, Early Fall)

CANR RTP Committee reviews
College-level Dean and Director reviews
***Initial feedback to candidates re status from chairs-directors to candidates
Revision of dossiers, if needed, with resubmission to College
Submission of dossiers, including Dean's recommendation, to University Committee (Gray, Youatt, Curry)

Very early January
Late Jan-early Feb
Early -mid Feb
Mid-late Feb
Late Feb

UNIVERSITY LEVEL

Dean's meeting with University Committee to review dossiers
***Preliminary decision from Univ review communicated to candidates by chairs-directors
Review of Univ-level decisions by provost, then, president
***Final decision communicated to candidates by chairs-directors
Tenure actions taken by MSU Board of Directors

Mar-Apr
Mar-Apr
Apr-mid May
late May-early June
June board meeting

(RTP decisions go into effect July 1 of that year; declinations of first and second reappointments result in position terminations on August 15 of the following year)
Dean's-Level Expectation:

What is an Assistant Professor?
(with specific reference to MSU as a research, intensive, Land Grant institution, with international obligations)

There is clear and abundant evidence that the assistant professor is confirming the potential seen in her or him at the time of initial appointment.

1. Establishing focus in one's work-one's "headline"-is critical. Focus represents a targeted area of scholarship for which one is known, a domain in which a scholarly reputation is built. There must be evidence that the declaration of focus is substantiated by high-quality, nationally (and/or internationally) competitive work in at least one dimension of the academic mission.

2. There is abundant evidence that all assignments are being undertaken with attention to scholarly quality and with work completed on a timely basis. Put another way, there are no apparent weaknesses in any of the primary areas of responsibility. The faculty member is perceived to be competent and has her or his "act together."

3. There is widespread recognition of collegial engagement and contributions. The faculty member works collaboratively with peer and takes on and completes (with quality) assignments in teams. This includes project work, team-teaching, and governance and related assignments at the unit level and beyond.

4. There is evidence of contributions being made to students-undergraduate and/or graduate. These contributions include guest lecturing, teaching courses, serving as a club advisor, and mentoring-advising graduate students.

5. There is a strong conviction that the faculty member "is on the right track" with a high probability of experiencing a positive review at time of promotion to associate professor with tenure. Weaknesses in 1-4 are noted at the first reappointment...unless it is felt that the burden of evidence suggests against a reasonable chance of success at the time of the next review.

When submitting dossiers for reappointment there is documentation of evidence and alignment of commentary-with what the candidate says about himself/herself and what the unit administrator and MSU peers say about the candidate's work. A point of comparison is the candidate's performance relative to what would be expected at MSU's peer institutions.
What is an Associate Professor?

(with specific reference to MSU as a research-intensive, land-grant institution, with international obligations)

There is clear and abundant evidence that the associate professor has established himself or herself as an accomplished academic.

1. It is obvious-by declaration, evidence, and reputation-that the associate professor has established her or his "headline" of academic focus. Focus represents a targeted area of scholarship for which one is known, a domain in which a scholarly reputation is built. The associate professor's reputation is substantiated by high-quality, nationally (and/or internationally) competitive work in at least one dimension of the academic mission.

2. There is abundant evidence that all assignments are being undertaken with attention to scholarly quality and with work completed on a timely basis. Put another way, there are no apparent weaknesses in any of the primary areas of responsibility. The faculty member is perceived to be competent and has her or his "act together."

3. There is widespread recognition of collegial engagement and contributions. The faculty member works collaboratively with peer and takes on and completes (with quality) assignments in teams. This includes project work, team-teaching, and governance and related assignments at the unit level and beyond. In taking on these assignments, the associate professor is viewed by many peers and others (e.g., administrators) as an academic leader-a person who (with time) will have senior standing in the Academy.

4. There is evidence of contributions being made to students-undergraduate and/or graduate. These contributions include guest lecturing, teaching courses, serving as a club advisor, and mentoring-advising graduate students.

5. There is a strong conviction that the faculty member "is on the right track" with a high probability of experiencing a positive review at time of promotion to professor. Weaknesses in 1-4 are noted at the time of promotion to associate professor ... unless it is felt that the burden of evidence suggests against a reasonable chance of success at the time of the next review.
Dean's-Level Expectations:

What is a Professor?
(specific reference to MSU—a research-intensive, Land Grant institution, with international obligations)

1. A professor has an established reputation at the national and/or international level(s) in her or his field(s) of study*. The reputation has been earned through years of sustained success and includes a verifiable record of accomplishment.

2. The professor has a reputation of being at the leading-edge of thinking and, often, practicing. True to the definition of scholarship, the professor creates or generates new knowledge, which is peer-reviewed and/or affirmed, and (then) used by others in their work. This approach translates into having a record of securing grants and contracts; of advancing knowledge through publication in high-end publications; and being cited by peers and practitioners as a source for their work.

3. A professor has presence, as a leader, at MSU and beyond (e.g., professional societies, national-level and/or international organizations). She or he "leaves a mark" because Initiatives and programs exist because of a professor's engagement. In light of a professor's standing, she or he is invited to speak at conferences; earns awards and honors from professional, civic, and industry organizations; is invited to serve on review panels; and is, generally, a "go to" person on topics associated with her or his expertise.

4. There is a longstanding and consistent track record of quality of performance with impact of activities in (at least) one dimension of the academic mission (e.g., research), and frequently in multiple dimensions, across the mission. The professor takes pride in doing work well, whether that work involves teaching an undergraduate class, chairing a task force, or writing a research proposal. Others provide testimony to the quality and impact of a professor's work.

5. A professor mentors well, giving time and attention to the importance of guiding the next generation of scholars—from undergraduate students, to graduate students, to post-docs, and to junior faculty members. A professor often has a successful track record in graduate education, and strives to involve undergraduate students in innovative and career-influencing ways. A professor also serves as a faculty mentor-informally and formally—and she or he often has a presence in academic governance at the department, college, or university levels.

*When submitting dossiers for promotion to professor there is documentation of evidence and alignment of commentary—from what the candidate says about himself or herself; to what the unit administrator and MSU peers say about the candidate's work; to what is written about the candidate by nationally-internationally recognized scholars from MSU peer institutions.
CANR Initiative: Strengthening faculty scholarship across the mission 1/25/08
(revised)

Background

During Fall Semester 2007 there was a robust discussion of scholarship – what it is and how it might be evaluated – in our College. This discussion was prompted by a call from the Dean's Office: the need to sharpen our ability to fulfill mission-related obligations as we do a better job of acknowledging and rewarding faculty for the work they do.

While faculty at MSU and CANR are expected to make contributions through research that move the frontiers of knowledge in their respective fields, they also undertake a variety of other work – undergraduate education, graduate education, and an array of Extension outreach and engagement responsibilities, on campus, around the state, across the nation, and all over the world – that often falls outside of the conventional way that we acknowledge and reward faculty for work in the research domain. It appears to some that research has become (or is becoming) the primary frame of reference for evaluating and rewarding faculty work. At issue, then, is how do we judge the quality of work undertaken across the mission (not just in research)? And, what does scholarship look like when it is expressed outside of research?

While these are important questions, it became apparent quickly that there are differences of opinion about what scholarship is and how it might be evaluated across the mission. For example, some saw virtually any work undertaken by faculty members – when that work is prepared and deployed thoughtfully (e.g., teaching an undergraduate class) – as scholarship. Others saw teaching classes as an important scholarly activity, but not as scholarship, which they saw as creating something new for a body of knowledge through peer-validation.

In addition, two primary concerns were expressed about the discussion of scholarship, generally. First, there were concerns that these discussions might lead to "one size fits all" metrics across CANR – applied to everyone, everywhere irrespective of potential differences in the work they do (e.g., teaching a study abroad course vs-a-vis involving students in an engagement experience overseas). In other words, while there is not likely to one answer to any core question (e.g., What is quality of Extension work), there probably are multiple answers to any question, with each answer fitting the nature of the work undertaken and/or the academic context in which it is being exercised. Second, concerns were expressed that emphasizing scholarship across the mission might diminish the value of work associated with teaching classes, doing Extension, and undertaking other non-research roles. If we were to emphasize work associated with scholarship in teaching, for instance, would that emphasis diminish the value of teaching classes? If so, then it might be better 110.tto have these discussions at all.

Points of Agreement
Interestingly, while no consensus emerged about how to frame the discussion, including how to define basic terms, there was general agreement about a framework—advanced in first form in September that stayed intact as the semester-long discussion unfolded: 1) for evaluating the quality and impact of teaching, research, and Extension-outreach-engagement activities; and 2) for defining and evaluating the quality and impact of scholarship associated with teaching, research, and Extension-outreach-engagement. Both outcomes seemed to be worthy in intent and outcome. The dual focus is expressed in the text that follows.

In all activities associated with teaching, research and Extension-outreach-engagement, faculty members undertake work that is informed by an academically recognized body of knowledge, undertaken in a scholarly manner, and evaluated as having quality with impact.

Scholarship across the mission – irrespective of whether it is associated with teaching, research or Extension-outreach-engagement – involves creating something new and valuable (that is, makes a contribution) in a disciplinary, professional, multidisciplinary, or interdisciplinary field; having the work validated such as by peers; and making the work “public,” that is, is available in an academically legitimate location for use in teaching, research, or Extension-outreach-engagement work.

Undergirding this two-pronged framework—again without much disagreement, although with interpretive differences—were statements authored at various times by faculty committees at the University and CANR levels, respectively.

From MSU policy:


Through its faculty, MSU will create knowledge and find new and innovative ways to extend its applications, to serve Michigan, the nation, and the international community. The faculty must infuse cutting-edge scholarship into the full range of our teaching programs. At MSU, faculty are expected to be both active scholars and student-focused, demonsrating substantial scholarship and ability to promote learning through our on-campus and off-campus education and research programs. The essence of scholarship is the thoughtful discovery, transmission, and application of knowledge, including creative activities, that is based in the ideas and methods of recognized disciplines, professions, and interdisciplinary fields. What qualifies an activity as scholarship is that it be deeply informed by the most recent knowledge in the field, that the knowledge is skillfully interpreted and deployed, and that the activity is carried out with intelligent openness to new information, debate and criticism.

From CANR Promotion and Tenure Committee Policy:
In order to evaluate a faculty member, the Committee defines scholarly achievements as a creative work that is peer reviewed and publicly disseminated. As such there are six forms of scholarship: discovery of knowledge; multidisciplinary integration of knowledge; development of new technologies, methods, materials or uses; application of knowledge to problems; dissemination of knowledge; and interpretation in the arts. This definition can be applied to teaching, research, extension/outreach, service and administration duties. The Committee is interested not only in how faculty invest their time, the activities in which they participate, and who they reach, but also in the short, medium and long term results and impacts of the faculty's scholarly efforts.
CANR-Faculty Statement on Scholarly Activities, Scholarship, and Impact

Spring 2012

**Purpose.** This statement has been created by the Faculty within the College of Agriculture and Natural Resources (CANR) to clarify the definitions and expectations for scholarly activities, scholarship, and impact in the context of review for reappointment to Assistant Professor (after the third year probationary period), and for promotion to Associate Professor with tenure to enable new faculty to understand current expectations. Additionally, the purpose of this statement is to enable mid-career faculty to understand how expectations have changed over time for promotion to the rank of Professor, and for Senior faculty to use within mentoring activities. Further, the goal of this statement is to share with the University our types of work and what we do. The criteria the document contains identify how we can move our work from scholarly activity to scholarship. The definitions and examples within this statement can be applied to teaching, research, extension/outreach, service and administration. It is important to remember that the evaluation of scholarly activities, scholarship, and impact will be consistent with an individual’s programmatic thrust and CANR appointment.

This document is to provide a faculty voice to join the existing documents of: *Promotion and Tenure: Philosophy and Protocol; Dean’s-Level Expectations;* and *Elements of a Strong RTP Package*, which are used for portfolio review by the CANR RTP Committee. All of these documents can be found on the CANR web page at the following link:

http://www.canr.msu.edu/canr/search_results?search=yes&query=Scholarship+Across+the+Mission.

**Process.** During the fall of 2011, a faculty representative from each unit was invited to attend the Faculty Scholarship Retreat, which was convened by the CANR Office for Faculty Development. Existing documents and scholarship across the mission statements from CANR units were reviewed and used as a basis for discussion of how to define scholarly activities, scholarship and impact as they apply to the expectations for reappointment, tenure and promotion within the context of the CANR and MSU missions. From those discussions, the statements within this document were created. The document has been vetted with Faculty within each unit by the respective College Advisory Council (CAC) representative, and has been approved by the CAC during December 2011. The document has also been vetted with the CANR Dean, Chairs and School Directors for their feedback. The statement is intended to lend clarity and transparency to the RTP process within CANR.

**Scholarly Activities**

All professional activities of the CANR Faculty are expected to be scholarly. *Scholarly activities* do not necessarily result in works of scholarship; however, works of scholarship are always culminations of scholarly activities. **Examples of scholarly activities include:**

- Papers, such as abstracts or proceedings, that are not peer-reviewed
- Non-competitive funding such as contracts or repeatedly renewed grants where proposed research funding is highly probable.
- Presentations to professional or stakeholder meetings
- Non-competitive exhibits, performances, or built works
• Public press materials
• Scholarly Activities that have not been peer validated or adopted by others such as:
  o Development of educational or pedagogical materials
  o Bulletins
  o Audio-visual productions
  o Handbooks
  o White papers
  o Workshops
  o Information databases
  o Development of germplasm
  o Student products
  o Bibliographies
  o Book reviews
• Student advising (undergraduate and graduate)

Scholarship

The essence of scholarship is the thoughtful discovery, transmission, and application of knowledge, including creative activities, that is based in the ideas and methods of disciplines, professions, and interdisciplinary fields. Scholarship is deeply informed by the most recent knowledge in the field, is skillfully interpreted and deployed, and is carried out with intelligent openness to new information, debate, and criticism. Scholarship meets three defining criteria: the activity creates something new, the work is peer-validated, and the work is publicly disseminated and available. Forms of scholarship include discovery of knowledge; multidisciplinary integration of knowledge; development of new technologies, methods, materials or uses; application of knowledge to problems; dissemination of knowledge; and interpretation in the arts. The outputs of scholarship are given a special place in evaluating Faculty performance at MSU and these objective creations are distinct from both the scholarly activities that undergird them and the impacts that flow from scholarship.

The objective outputs of scholarship are creative works that receive critical and appropriate validation (e.g., peer-review) and are publicly disseminated or accessible. Works of scholarship are viewed as the critical objective products of scholarly activities, and examples of such works include:

• Refereed publications
• Juried competitions
• Successfully funded competitive grants
• Peer reviewed/competitive exhibits, performances, and built works
• Patents, crop/cultivar releases, and licenses
• Books and peer validated/competitively selected book chapters
• Scholarly activities that become validated upon adoption by others:
  o Pedagogy development
  o Bulletins
  o Handbooks
  o White papers
  o Workshop materials
Information databases or software
- Audio-visual productions and new media
- Policy

Impacts

Impacts of scholarship and scholarly activities can be defined as their effects on practice, thought, and systems. Each faculty member contributes a body of knowledge to society, and assessment of impact is an attempt to integrate the quality of productivity over a career. Thus, individual flexibility needs to be allowed in the use of criteria, and weighted for career stage, to evaluate impact by examining changes over time, as well as the depth, breadth and quality of the impact. The ability of the impact to catalyze/instigate positive and sustainable change while aligning with the mission of CANR is valued.

Examples of impact include:

- Significant improvement in economic, social or environmental conditions of a community, region, agency, industry or other sector
- Invitations to present or write
- Generation of major gifts to endow a program
- Citations of work by others
- Adoption or use of work by others
- Awards, honors, and professional recognition
- Invitations to serve on review panels or to review papers or proposals
- Leadership in field/discipline and duration of such leadership
- Awards or competitive work by students
- Placement and career success of former students in the discipline/industry
- Students taught and student responses to classes

Summary

This document defines scholarship as a creative work that is peer-reviewed and publically disseminated. It is important that we define and apply basic, uniform principles of scholarship across the multiple forms of scholarship in CANR. It is critical to always remember that scholarship is not defined by what one does, but by the results and impacts on target audiences.
Extension in Reappointment and Promotion Packets: Guidance for CANR faculty at MSU

Many faculty members in the College of Agriculture and Natural Resources at Michigan State University have a formal extension component to their appointment. Others have no formal extension appointment but are actively contributing to the outreach mission of the college and university. This aspect of the faculty member's work should be clearly documented and discussed in the promotion application materials provided for review by the CANR Promotion and Tenure committee (the committee) and by the administration. The MSU Form D provides limited opportunity for reporting on the scope and impact of this important role of many CANR faculty, so we encourage discussion of extension quality, scholarship, impact, and philosophy in the Reflective Essay as appropriate for the applicant's appointment. Our aims in preparing this document are two-fold:

To emphasize that the extension component of a faculty member's activity is evaluated carefully by the committee and by CANR leadership, and that we expect to see documentation of performance appropriate to the appointment and rank.

To provide guidance for MSU CANR faculty in documenting their performance in extension during the reporting period.

There is no single blueprint for how to build an extension program and so the committee encourages applicants to express their individual strengths and unique contributions to MSU Extension when applying for promotion. We recognize that stakeholders have varying needs and that extension information can be disseminated in many different ways. The Reflective Essay provides an opportunity to present a personal reflection of how an individual has developed their own extension program and delivered meaningful outcomes within these realities, and their plan for this aspect of their program in the future.

As CANR faculty members at MSU, there is an expectation that scholarship is at the core of what we do, and this applies to extension as much as to other components of the mission. Extension scholarship is defined as "The systematic generation, integration, and application of knowledge based on both concepts and practice with the intent of improving peoples' lives"¹. Scholarship of extension takes place through an interactive, dynamic, and expanding process in which both concepts and practice are advanced through a continuing process for improved knowledge that is validated by peers. Extension scholarship can be accomplished in many ways. One of the important strengths of MSU Extension is its flexibility in the use of multiple approaches that are best adapted for developing, integrating, applying, and teaching knowledge in a variety of ways to benefit stakeholders. Some of these mechanisms of accomplishing extension scholarship include the following activities: oral presentations such as talks, speeches, seminars, workshops, radio and TV programs; visual materials including slide sets, computer-based audio-visual presentations; written materials such as articles, papers, reports, bulletins, handbooks, fact sheets, newsletters, notebooks and journal articles; electronic media such as websites, blogs, social media; working with clientele organizations including boards, councils, committees, task forces and workgroups in problem solving activities; providing information and educational aspects regarding policy development, etc. In the promotion packet it is critically important for a faculty member to look beyond activities though, and to clearly communicate the scholarship forming the basis of their extension program.

¹ Some material presented here has been extracted and adapted from the 2003 report of the MSUE Working Group on Scholarship of Extension.
Instances of extension delivery can be reported and counted in Form D, but the committee is also interested in evidence of why a faculty member has structured their extension program and activities the way they have. How were priorities identified, how were activities developed, what was delivered, and how have these programs helped address stakeholder priorities? How does the extension component of the appointment link to the research and/or teaching component of the activities? Form D is the place to provide lists and summary statistics of extension output, but it is important to complement this in the Reflective Essay with information to help the reader understand the rationale, outcomes, and impact of the activities. This can provide context for the committee to understand why a program is structured the way it is. For example, if the majority of extension effort has been in only one approach to information delivery, the faculty member may then justify why that is the most appropriate method to reach the target audience. If cutting-edge approaches or technologies have been used for information delivery, the reflective essay can describe why it was done that way and how that has supported the programs’ goals and impact. We expect faculty to be leaders, so discussion of involvement in campus based Extension Institute planning, or redesigning units’ interactions with extension educators and growers, or leadership related to advising commodity/stakeholder groups, are appropriate to include in the Reflective Essay.

While a higher number of documented extension activities would be better than fewer, there is no target number. Rather, the committee is looking for evidence of a positive trajectory in terms of developing scholarship, impact, and leadership in extension over time. Expectations are higher for the scope of extension programs at promotion to Associate Professor than at Reappointment, and at promotion to Full Professor than at Associate Professor. There are many ways that such a trajectory can be documented, for example through greater geographic spread of impact, increasing funding for extension activities, greater change in an outcome metric of relevance, higher attendance at your workshops, etc. For early-stage faculty preparing for reviews by the committee, we encourage development of some program evaluation metrics that will help them demonstrate a positive trajectory of their extension program.

Based on the 2012 university-wide policy regarding review letters for reappointment, promotion, and tenure decisions, outside letters to include in the application packet should be from 4-6 established faculty of higher rank at peer institutions. Letters from other types of institutions must be carefully justified in the supporting material provided by the chair or director. For CANR faculty with extension appointments, one or more of the names provided to the chair or director should be a faculty member with an extension appointment or someone with experience evaluating extension faculty for promotion and tenure at their own institution. Input from commodity group representatives or other stakeholders can be solicited by the chair or director, but this information should be included in their cover letter to address evidence of meeting stakeholder needs, as this type of letter cannot be used as a review letter.

Ultimately, the faculty member and department chair/director are responsible for the delivery of an application packet that includes thorough documentation of the research, teaching, and extension activities during the reporting period. Each packet will be evaluated by the committee based on the material presented and in the context of the appointment. Our goal in preparing this document has been to highlight the need for thoughtful reporting of how extension activities fit into the overall goals and direction of a faculty member’s program, and there are many ways to do that. Through this document we hope to help demystify the process of Reappointment, Tenure and Promotion review in the College of Agriculture and Natural Resources at Michigan State University.

CANR Reappointment, Promotion & Tenure Committee
Spring 2012
Elements of a Strong RTP Package

Guidelines were prepared by Professor Doug Landis, CANR RTP Committee, Entomology.
These recommendations have been adopted by the CANR RTP Committee and are used in portfolio reviews.

Reappointment to Assistant Professor

Bottom line: clear evidence that the candidate is establish a program that can achieve excellence in the area(s) of major appointment. The candidate does not need to be there yet, but there should be clear signs that they are on their way.
Some benchmarks include:

- In Research
  - Obtains sufficient funding to initiate a program
  - Increasingly, some funding should be sought from competitive national sources (USDA, NSF, NIH etc.)
  - Attract students and/or post-docs
  - Finishes publishing prior work (PhD, post-doc) and ideally has MSU work published or in press

- In Teaching
  - Is recognized as a solid teacher by colleagues and students
  - Shows true interest in teaching, evidence of innovation
  - Obtains very good SIRS summary scores (1's and 2's) and/or is showing evidence of improvement

- In Outreach
  - Obtains sufficient funding to initiate a program
  - Is recognized by clientele and colleagues as interested and dedicated to outreach
  - Shows initiative/innovation in outreach

- In Service
  - Contributes to Departmental activities when asked
  - Evidence of potential for contributions at national level e.g.
    - Journal peer reviewer
    - Membership in state/regional committees
Elements of a Strong RTP Package

Guidelines were prepared by Professor Doug Landis, CANR RTP Committee, Entomology.

These recommendations have been adopted by the CANR RTP Committee and are used in portfolio reviews.

Promotion to Associate Professor with Tenure

Bottom line: Clear evidence that the candidate has established a program of excellence in the area(s) of major appointment and has at minimum good performance in area(s) of minor appointment.

Generally this will include evidence of national recognition from solicited letters with invited presentations at peer universities and national meetings

In Research

Obtains sufficient funding to support and grow a program

Obtains funding from diverse sources, including competitive national sources (USDA, NSF, NIH etc.)

Attracts students/post-docs

Has graduated students who obtain suitable positions

Has established a record of consistent publication in peer-reviewed journals

Publishes in the best journals available for the particular discipline as measured by impact factors and within-discipline journal ranking

Is achieving suitable citation rates

In Teaching

Is recognized as an excellent teacher by colleagues and students

Shows passion/innovation

Consistently obtains excellent to very good SIRS summary scores (1's and low 2's)

Shows evidence of scholarship in teaching and learning

In Outreach

Obtains sufficient funding to support and grow a program
Is recognized by clientele and colleagues as excellent in outreach

Shows passion/innovation

Shows evidence of scholarship in outreach

In Service

- Consistent contributor to Departmental activities
- Contributes to University level activities
- Consistent contributor at national level
  - Sought out as journal peer reviewer, potentially editorships
  - Sits on national (USDA, NSF, NIH) grant review panels
  - Leadership in regional/national committees
  - Organizes national symposia, meetings, workshops
Elements of a Strong RTP Package

Guidelines were prepared by Professor Doug Landis, CANR RTP Committee, Entomology. These recommendations have been adopted by the CANR RTP Committee and are used in portfolio reviews.

Promotion to Professor

Bottom line: clear evidence that the candidate has established a prolonged program of excellence in the area(s) of major appointment and has at minimum good performance in area(s) of minor appointment.

Generally this will include:

- Evidence of national and international recognition from solicited letters or other sources
- Regularly invited to present at peer universities, national and international meetings

- In Research
  - Obtains consistent funding and has maintained a strong program over an extended period
  - Obtains funding from diverse sources including competitive national sources (USDA, NSF, NIH etc.)
  - Consistently attracts, graduates and places high-quality students/post-docs
  - Has an extended record of publication in the best journals available for the particular discipline as measured by impact factors and within-discipline journal rankings
  - Is achieving strong citation rates.

- In Teaching
  - Is recognized as an excellent teacher by colleagues and students
  - Shows passion/innovation
  - Consistently obtains excellent SIRS summary scores (primarily 1’s )
  - Shows sustained evidence of scholarship in teaching and learning

- In Outreach
  - Obtains consistent funding to maintain a strong program over an extended period
  - Is recognized by clientele and colleagues as excellent in outreach
  - Shows passion/innovation
  - Shows sustained evidence of scholarship in outreach

- In Service
  - Strong contributor to Departmental activities
  - Contributor to University level activities
  - Strong contributor at national/international level
    - Sought out as journal peer reviewer, potentially editorships
    - Sits on national (USDA, NSF, NIH) grant review panels
    - Leadership in national/international committees
    - Organizes national/international symposia, meetings, and workshops
Points of Relevance for Junior Faculty

Promotion and Tenure Committee

Review the Principles for Faculty Evaluation that the CANR P&T Committee uses.

Quality not quantity. The Committee emphasizes quality, impact and that the tendency to list everything is not helpful and tends to obscure the more significant.

Top Journals in your field. A part of quality is to publish at least some work in the top journals in your subject area. The Committee looks for that evidence, especially at tenure decision time.

Reflective essay. This is your opportunity to show the quality of your thinking, your vision and the logic for your program, your strategy and implementation, including weaving in what you have achieved to date, your trajectory and where you plan to be in 10 years. The essay should emphasize the intellectual foundation of your work and plan in contrast to reporting or listing what you have done; the later should be well covered in the university forms and your vitae.

Early promotion. The Committee looks for compelling reasons for this award, a truly an extraordinary record of scholarship. A significantly higher standard of achievement is expected than for promotion in the normal time period for the rank. Life is long and there is no great benefit to the individual and institution to rush its major stages, except for the very exceptional case.

Your area of scholarly excellence. Begin early to think about and develop your topic of excellence, what you will be known for, and articulate this expertise in your documents. For example, your goal is for anyone in your national or international field, if asked, to identify you as a world authority on the subject (modified of course for the culture of excellence in your discipline/assignment area).
Principles for Faculty Evaluation

CANR Promotion and Tenure Committee

1. To effectively evaluate a faculty member, the Committee must consider and evaluate three major categories for excellence:

a. an assessment of the faculty member's performance of assigned duties;

b. an assessment of the person's scholarly achievements; and

c. an assessment of the person's service activities.

In conducting assessments, the Committee operates on the premise that faculty excellence is a matter to be judged, not measured.

2. Assigned duties for a faculty member can include research, teaching, extension/outreach and/or administration. Because the college is a collaborative effort, contributions to collaborative works are included in the assessment of performance of assigned duties. Furthermore, it is expected that a faculty member will demonstrate a commitment to standards of intellectual and professional integrity in all aspects of faculty responsibilities. The Committee acknowledges that some faculty positions will be more disciplinary oriented with few additional responsibilities, whereas others may have extensive assigned duties in teaching, extension/outreach, advising) or administration. However, some scholarly activities are expected of all tenure-track faculty members regardless of assigned duties. The Committee assesses performance according to assigned duties, not in relation to the budgetary appointment.

3. In order to evaluate a faculty member, the Committee – following Boyer (1990) and Weiser (1999) defines scholarly achievements as a creative work that is peer-reviewed and publicly disseminated.

As such there are six forms of scholarship:

a) discovery of knowledge;

b) multidisciplinary integration of knowledge;

c) development of new technologies, methods, materials or uses;

d) application of knowledge to problems;

e) dissemination of knowledge; and,

f) interpretation in the arts.

This definition can be applied to teaching, research, extension/outreach, service and administration duties. The Committee is interested not only in how faculty invest their time, the activities ill which they
participate, and who they reach, but also in the short, medium and long term results and impacts of the faculty's scholarly efforts.

4. Service activities are implicit in the appointment of all faculty members. A faculty member is expected to demonstrate excellence in service through a continuing commitment to academic professional and public service activities.

5. A faculty member is expected to demonstrate continual involvement in his or her intellectual and performance capabilities by improving his or her effectiveness in teaching, research, extension/outreach) service and/or administration. A faculty member also is expected to make contributions to the collegial environment of his or her academic unit.

References


Committee of the College of Agriculture and Life Sciences, Faculty Evaluation Principles,

Scholarly Activity Definition, Virginia Polytechnic Institute and State University, October 25, 2004.


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Faculty Mentoring Policy
College of Agriculture and Natural Resources (CANR)

Introduction

CANR is committed to the professional development and successful advancement of its faculty members. Toward that end, steps need to be taken to ensure that faculty reviews are conducted annually at the unit level (to include written assessments given to faculty members) and that faculty members are informed about the measures and indicators that will be used to evaluate their performance.

In addition, the College believes that effective faculty mentoring is an important component that contributes to successful professional development. Effective mentoring involves activities undertaken at the university, college, and unit levels. University policy requires that all colleges have a formal and substantive mentoring program for pre-tenure, tenure-stream faculty.

Department/School Obligations

CANR recognizes the central role that academic units play in enabling faculty development and also respects the variation in disciplines-professions and missions across academic units in the College. With those points in mind, academic units will play the primary role in establishing formal and substantive mentoring for pre-tenure, tenure-stream faculty members; and this mentoring will continue through the time of advancement to the rank of professor. Mentoring will also be available to fixed-term faculty members who hold the ranks of assistant professor and associate professor; and academic specialists who are appointed in the Continuing System, but who have not as yet earned Continuing Status.

The goals of department/school mentoring may vary by academic unit, but at a minimum should:

- Support faculty excellence across the mission by helping faculty establish and sustain a leading research program; effective teaching and engagement of undergraduate and graduate students; and an effective and high-impact extension, outreach, and engagement program.
- Encourage faculty involvement in professional activities, nationally and internationally.
- Help faculty strengthen their institutional and disciplinary-professional leadership skills.

The mentoring approach may vary among academic units, but must include the following elements:

1. There will be a written document incorporated into the unit bylaws and actively implemented, which identifies and communicates policies, goals, and expectations for mentor(s) and those being mentored.
   a. There will be a description of the process to select mentors and a mechanism allowing for changes in assignment of mentors as appropriate for the junior faculty member’s needs, and an alternative provision for faculty members to choose not to have mentors. One or more senior faculty members (not including the academic unit administrator) should be assigned as mentors. Selection of mentors is not limited to the academic home of the junior faculty member.
   b. For faculty members with joint appointments, there will be a single mentoring plan coordinated across units— with leadership provided by the lead unit.
   c. There will be a description of expected mentoring activities with elements addressing research,
teaching, extension and outreach, engagement, and leadership development.

d. There will be clarity regarding the roles of mentor(s) and the faculty member being mentored; expectations for confidentiality; the role of mentor(s), if any, in the annual evaluation and RPT process; and who (including the mentee) does/does not see written mentoring reports, if such reports are prepared.
e. There will be a description of how mentoring activities will be reported and evaluated as a portion of an individual’s service to the unit.

2. There will be support and leadership from the chair/director in integrating mentoring into departmental activities. Recognition of mentoring as a formal component of faculty service to the department and college should be incorporated into annual faculty evaluations for individuals who serve as mentors.

3. There will be sensitivity in the academic units and mentors to potentially different challenges faced by diverse faculty.

**College Obligations**

Support for mentoring CANR faculty members will be provided under the leadership and direction of the CANR Director of Faculty Development (DFD), who will also be responsible for the development and regular review of the policy. The DFD will also have responsibility for ensuring that all faculty members are informed about faculty development programs in CANR and at MSU. This support will include:

1. Provision of sources of information/link to available university resources concerning good mentoring practices and information about CANR unit policies;
2. Organization of workshops and faculty development programs(either by the College or in conjunction with the university, through such units as the Office of Faculty and Organizational Development);
3. Assistance for units (through the respective chair’s or director’s office) to create and maintain a central repository for information about mentoring policies; and
4. Provision of information to prepare new faculty (e.g., resources, expectations) as part of annual college orientation;

The DFD will also serve as a confidential source available to all CANR faculty members —to serve as a resource (by identifying appropriate individuals with relevant expertise for advice/consultation for professional development) and/or by discussing sensitive issues with CANR faculty members at the faculty members’ invitation.

**Review and Evaluation**

The effectiveness of the college and unit mentoring programs will be assessed at an interval not to exceed 5 years.
Introduction

The Reflective Essay is an integral part of the reappointment, tenure and promotion process at virtually all universities. The reason for its universal importance is that "a capacity for reflection and self-evaluation ... is a critical ingredient in a professor's life" (McGovern, p. 96).

As such, the Reflective Essay holds a unique position in the candidate's dossier of supporting evidence. The CV (curriculum vitae) and Form D--no matter what the length--will be read and discussed by reviewers. Consequently, the Reflective Essay should not be a summary of evidence presented in those documents. Instead, the Reflective Essay is "an opportunity to weave a tapestry of understanding of [your] scholarly pursuits" (Smith, p. ii).

Intent and Use

The Reflective Essay serves as the "key orienting and organizing element of the [dossier]" (Froh, et. al. p. 108) with the purpose of "providing a frame of reference 01' context for the items submitted to the committee" (Diamond, p. 24). Consequently, the Reflective Essay is the primary opportunity the candidate will have to convey the nature and meaning of her/his scholarly work and philosophy to those reviewers from his/her and other disciplines (Millis, p. 69).

Above all, the Reflective Essay should (a) convey the candidate's vision of herself/himself as a maturing or mature scholar (including describing one's scholarly niche); (b) communicate the contributions made during the reporting period in advancing toward that vision; (c) provide an indication (evidence) of the impact of the candidate's scholarly efforts; and (d) show development-evolution of the candidate's scholarship.

The objective of the Reflective Essay "is to convey as much depth and richness as possible by [employing] selective evidence of [scholarly] accomplishments" (Froh, et. al., p. 106). Above all, candidates should remember that the Reflective Essay is "a reflection of the care [the candidate] take(s) in communicating scholarship" (Smith, p. ii).

Preparation Guidelines

The preparation of the Reflective Essay should begin early in one's MSU--CANR career, and should be updated on a periodic basis throughout the reporting period (e. g., during the annual evaluation process). Approaching it this manner will enable the candidate to prepare a document that represents a more accurate and convincing expression of the evolution of one's scholarly development. With all of this in mind, here are 8 guidelines for the development of a Reflective Essay:

1. Because the Reflective Essay is just that--a personal reflection written in essay format--it is important that it...
be crafted as an intellectual piece, an academic contribution in its own right, rather than as a document that reports academic accomplishments. Most of all, the essay should

2. The Reflective Essay should convey the candidate's vision of himself/herself as a maturing or mature scholar. It is an opportunity to convey one's scholarly philosophy and vision; to describe how Scholarly priorities were established; to share the logic of one's program of scholarship (and its development); to make explicit the strategy (choice making) used over the years; and to be clear about one's future trajectory.

3. The Reflective Essay should be expressed in manner that is consistent with CANR's interpretation of scholarly activities and scholarship. Scholarly activities cut across the mission of teaching, research, and outreach / Extension / engagement. Activities are "things scholars do" (e.g., designing and offering an undergraduate class). While scholarship also applies to all mission dimensions, it is an outcome, not an activity. Scholarship involves creating something new; and it is designed to advance understanding by contributing something new to a body of knowledge. "Newness" is peer reviewed or validated; and products of scholarship are made available in publicly accessible forms and ill publicly available locations. The worth of both scholarly activities and scholarship is evaluated in multiple ways: in terms of intellectual quality (substance-content); quality of

"demonstrate a capacity to be reflective and self-critical; hence, capable of continued growth and change" as a scholar (Diamond, p. 24). expression (how the work is constructed and presented, particularly in terms of its relevance to intended audiences); and its impact on and/or use by intended audiences.

4. Because each candidate's mix of assigned duties is unique, the essay should address all aspects of the candidate's assigned duties--activities and scholarship--in a manner roughly proportionate to those duties-teaching, research, outreach / Extension/ engagement, and service to MSU and profession (Froh, et. al., p. 107). It is understood that scholarly activities and scholarship influence a wide range of audiences (e.g., disciplinary peers, scholars ill other disciplines, students, public officials, industry members, members of nongovernmental organizations). Consequently, just as each candidate's assigned duties is unique, the impact of each candidate's activities and scholarship is also likely to be unique (at the very least distinctive in nature and contribution).

5. Because the hallmark of the scholarly life is integration and connections across the mission, the Reflective Essay should demonstrate the candidate's integration of work across her/his assigned duties (e.g., how research influences teaching; how Extension influences research).
6. The Reflective Essay "provides a vehicle for discussion of special circumstances that have affected your work to-date" (Diamond, p. 24). There are always critical times or points in an academic's life, when an academic decides to move in one way or another. Sometimes these

7. The Reflective Essay also provides an opportunity for the candidate to explain "any contradictory or unclean materials in the [dossier]" (Seldin, p. 10). However, explanations should be reserved for unique events; and, when included in the essay, the description should not consume an undue portion of the essay.

8. A useful means of developing a Reflective Essay may be to periodically consider a series of "reflective prompts" that will induce reflection about "why we teach; why we work as we do; why we choose certain priorities in... scholarship; why we publish in this or that field or particular topic; ... [thereby leading to] meaningful inquiry into what we do and how we do it" times or points are products of one's own doing—a outcome of intent. At other times, they are either a result of opportunity ("being in the right place at the right time") or unexpected circumstance (e.g., departure of a senior collaborator from MSU).

(Zubizarreta, p. 208, italics in original; for additional useful prompts, see McGovern, pp. 103-08).

Final Comments

Remember..., the Reflective Essay is the candidate's opportunity to communicate the quality of thinking, vision and logic of the program, strategy and implementation—incorporating what has been achieved to date; the trajectory of the program; and the targets and milestones anticipated in the next 10 years, The Essay must emphasize the intellectual foundation of the work and plans for the future. The Essay must not be a reporting or listing of what has been done in the past; this is well covered in Form D and the CV.

REFERENCES


Science Foundation (NSF Early CAREER and Arabidopsis 2010), as well as from the USDA Specialty Crop Research Initiative.

In parallel with my Arabidopsis-*Pseudomonas* focus, my research interests have grown to include investigations into the field of oomycete-plant interactions. This was, at first, an intimidating venture into the unknown. Through conversation with faculty here at MSU (Dr. Mary Hausbeck, Dr. Ray Hammerschmidt and Dr. Robin Buell), as well as support from Dr. Sophien Kamoun, the "Day Lab" became heavily invested in the genomics and genetics of cucumber downy mildew, elicited by the obligate oomycete pathogen *Pseudoperonospora cubensis*. At present, we have secured a USDA grant, as well as industry funding, to establish a foundation in this area. We have published 2 manuscripts (*Mol. Plant Pathol.* and *MPMI*), and have 3 more under review (2 at *PLoS One*, and 1 at *PLoS Path.)*. All in all, this has been a sound investment, and more importantly, has broadened my group’s interactions with some of the World’s leaders in the field of oomycete biology, while growing my curiosity in plant-pathogen interactions. Over the next 5-10 years, I see my research program developing more avenues of research similar to the work we are pursuing with downy mildew of cucumber.

Beginning in January 2012, my laboratory will move to the new, state-of-the-art Plant Science Building, sharing a 15,000 square foot lab space with Dr. Gregg Howe and Dr. Sheng Yang He. Across the plant sciences at MSU (>150 faculty), 12 research groups were selected. This is a unique opportunity, not only in providing me with two excellent mentors and potential collaborators, but for the students and postdocs in my research group, this will provide them with numerous learning and mentoring opportunities.

**Grantsmanship**

My lab is not poor, but we aren’t what I would consider “rich”. We write, we submit, we revise, resubmit, and more often than not (so far!), we’re funded. We pick and choose carefully, not submitting a proposal for funding until we are confident we have an exciting story to tell. That said, in the current climate, my general philosophy is to limit the number of (relevant) submission deadlines that pass without having one of my grants submitted. At the same time, however, I am very critical as to the quality of the proposal; I will not submit a proposal that I feel is not ready for funding. To this end, my first proposal was more than 6 months in the making. Before arriving at MSU, I began drafting the outline for my first submission. When I arrived at MSU, I began the experimentation necessary to generate the preliminary data, and when Miaoying arrived, the experimentation was validated, and the preliminary data assembled. In the end, the proposal was funded by the National Science Foundation as a Young Investigator CAREER Award. There’s nothing like getting your first grant funded; I will admit, I still jump when every proposal is funded. At present, I have had 3 NSF grants, a USDA grant, substantial funding from industry, and a significant amount of funding through internal mechanisms at MSU.

As part of several of my funded proposal, collaborative efforts have enabled me to be a part of larger ($$$) grants, thus enabling a broader scope in our investigation of various problems related to disease resistance in plants. For example, together with Chris Staiger (Purdue) and Jeff Chang (Oregon State), a NSF-funded Arabidopsis 2010 grant is allowing us to investigate the role of actin in defense signaling. Similarly, as co-PI on a grant with Dr. Yiquan Weng (USDA-ARS, Madison, WI), I am simultaneously investigating the genetic determinants of downy mildew resistance in cucumber. Both of these opportunities have impressed upon me the necessity of collaboration in science, and more importantly, the pace at which good science...important science...moves.

**Mentoring**


This area is an on-going challenge for me, not because I don’t enjoy it, but because I want to do the best I can. Mentoring, as I have learned over the past 5+ years, is more than serving as a training mechanism for postdocs and students. Mentoring is an all-inclusive commitment to the personal and professional development of the individuals I ask to work in my lab. As I began building my research group, integrating personalities was one of the toughest tasks I encountered, and at present, still presents a minor hurdle now-and-again. Decisions related to work ethic (i.e., motivation), career stage and the ability to work well with others are factors that weigh heavily in my decision to hire someone. Looking back over the previous 5 years, I feel I have been successful in this arena.

Beyond my direct interactions with postdocs and students, I have also developed a personal philosophy as to how these two groups of individuals should interact (in a perfect world!). My current philosophy is to have a 1:1 ratio of postdocs to students; however, as I write this, I look into the lab and see more students than postdocs. I have great students! Regardless, a balance of personnel facilitates several important social and professional networks within the lab. First, it provides postdocs with an opportunity to develop the mentoring skills they will need/use as they move into their own independent research positions. Over the course of my training and education, I have had the opportunity to work directly, one-on-one, with postdoctoral researchers. I found these interactions to be invaluable not only in my professional development, but also as bridges in building long-lasting friendships. Secondly, and most importantly, ratios of postdocs and students can significantly transform the lab environment. Too many postdocs can create a competitive atmosphere within the lab whereby students feel intimidated, less creative and may retreat to secondary roles within the lab’s infrastructure. At the same time, students bring youth, inquisitiveness and a bit of chaos and spontaneity to a stressful environment. As I have watched my lab grow over the last 5 years, it has been transformed with laughter, (yes even) tears, shouting, high 5’s and the occasional “look at this result….this is cool!”. I am hopefully the next 20 years will echo with the same sounds!

Teaching

Mentoring and teaching go hand-in hand. Beyond my roles as an educator in the lab, I also assume duties as an instructor for a graduate-level course in plant-microbe interactions (Plant Pathology 881). To date, Dr. Hammerschmidt and I have co-taught this course 3 times (2007, 2009, 2011), and I found this experience to be both rewarding and challenging. On the one hand, this is an area that I feel very comfortable teaching—it is my area of expertise. On the other hand, making the information accessible to a broad audience sometimes proves challenging. Fortunately, I teach a course that I feel very comfortable teaching, both in terms of understanding the content, as well as communicating it to a broad audience. Overtime, I would like to further develop this into a course that is, for all intensive purposes, my own.

My general philosophy is, and always has been, that teaching is an engaging profession. The responsibility of the instructor is to interact with, excite and challenge the students. Over the next 5 years (2 course offerings), I would like to begin the transition towards developing this course into a class that is widely recognizable across multiple departments and programs, and moreover, has a consistent enrollment of 20 students per semester. This past spring, Dr. Hammerschmidt and I made a significant step in achieving the goal, with approximately 20 students from 6 different departments enrolled. As the administrative mechanisms at MSU are changing to accommodate increasing budget constraints, we too must recognize that in an ever-increasing competitive environment, instruction also competes for the attention and focus of the next generation.

Service: University, Discipline and Community
Community service is one area of my professional development that I find the most rewarding. At the University level, “service” has many definitions, yet none as important as recognizing the vision and role of the institution in the years to come. Just as I have 5, 10 and 20 year plans, so does MSU. In recognizing that I will likely be here for some time to come, it behooves me to help the administration find the vision and direction for the University, both locally, nationally, as well as internationally (see below). To this end, I have volunteered my time to serve on several University committees during my tenure here at MSU. In 2006, I had the privilege of working with Dr. Eunice Foster as part of the CANR’s office of Diversity and Pluralism. This was hands-down the single-most rewarding experience of my time here at MSU. I had the opportunity to serve as an Ambassador and recruiter for MSU, visiting several Historically Black Colleges and Universities (HBCU) in Mississippi, speaking with students about their plans for the future, and telling them about MSU. In all of this, I was reminded of my role as (assistant) professor at a top-tier University----education, outreach and research.

The second instance of my service to MSU was part of the Plant Sciences Excellence Committee, which was charged with designing the future of the plant sciences at MSU. Our plan was grand. In 2010, I was fortunate to witness the first of many significant steps that MSU will take in advancing the prowess of Plant Science research at MSU—the beginning of construction of the new Plant Science building, designed to accommodate state-of-the-art interdisciplinary research in the plant sciences. As an aside, I am fortunate to be moving into this building in January 2012, where I will share a 15,000 square foot lab space with Sheng Yang He and Gregg Howe.

“Be careful what you ask for!”. As I donned the role of eager young assistant professor, taking every opportunity to assist and serve within my MSU community, I was presented with an opportunity to serve as my Department’s representative on the MSU Plant Science Graduate Recruiting Committee, a unit borne out of the vision of the late Dr. Hans Kende, charged with bringing the best and brightest to Michigan State University. For 3 years, I observed, learned and participated in the tough task of identifying from more than 200 applicants the top 30 to invite to campus. From this, 5 were selected for fellowships. In 2010, after more than 10 years of service, Dr. Rebecca Grumet stepped down as chair, and recommended to the Dean of the Graduate School that I take her place. I am now in my second term as chair of the committee, and am enjoying it immensely. We have continued the success of this program, increasing our new plant science student population to more than 20 each year; this is in addition to the academic unit recruits, which themselves currently surpass 30.

Finally, service to the community and my discipline is equally important. I rarely pass on an opportunity to review manuscripts that I am qualified to review, nor do I miss an opportunity to participate in a review panel at the NSF; the latter is equally important as a learning opportunity for me! To this end, I have participated in close to 10 NSF panels (Integrative Organismal Systems, Major Research Instrumentation, East Asia Pacific Graduate Fellowship) in the 5 years since beginning my tenure as Assistant Professor. These have been regarding opportunities, not only in seeing how the process of peer review and funding works, but as noted above, I get to read some of the best proposals in the US! I learn communication skills, what it takes to assemble a grant, and more importantly, train myself as a visionary (of sorts!), gaining a “high altitude” perspective of science and research. For my discipline, I have successfully written a USDA proposal to support student and postdoc travel to the next MPMI meeting, to be held in 2012 in Kyoto, Japan. Pay it back, or pay it forward. I have been fortunate in receiving support from my colleagues and the mechanisms (i.e., grants) that support us. I wholeheartedly recognize that as part of the process, my duties often require me to participate in the peer review process, for it is the same process that determines my own success.
International Presence

I sometimes ask myself “what would I do if I could choose another profession?”—this question often rings through my mind sometime between 24 and 72 hours before a grant deadline! My answer is always swift: “I want to work for the NSF in the Office of East Asia and Pacific Programs.”. I want to travel. I want to talk about science with professors from Tokyo University, with farmers in Brazil and students in Africa. I had a plan, but no real desire to leave MSU. Then I remembered something my Ph.D. advisor, Dr. Gary Stacey, said to me in 2009. Now at the University of Missouri, Gary is involved in International Programs and Research at MU. I remember him regaling tales of his travels, from Cambodia and Vietnam, to Korea and China. He talked of dinners with the Provost and President, with senators and the like. After 10 minutes of this, he looked at me and said, “but Brad, you know, no matter where we go, what we (MU) promise and propose to each of these International research institutions, the first thing they say is, Michigan State was here 2 weeks ago!”. With that, I realized that MSU is a global institution.

As a Faculty member at MSU, I am responsible for maintaining an international presence through science, outreach and education. To this end, I have begun to actively pursue international opportunities as a means to not only broaden the scope of my research interactions, but to “test the waters” if I might contribute to the research of others. Thus far, I have visited China, Thailand and Kenya as part of education and outreach opportunities. In the case of the latter, I have maintained contact with many new colleagues in Africa, and together with Dr. Jeff Chang (Oregon State), will be preparing a short proposal for initiating research activities with BeCA (Biosciences eastern and central Africa). Similarly, my connections in China have sustained the test of time and distance, and I continue to build and renew initial conversations, developing collaborative interactions with some of the world’s leaders in the field of genomics, genetics and vegetable research.

Summary

In short, my time here at MSU as an Assistant Professor has been rewarding. I’ve come to realize that I will never be able to give back as much as MSU gives to me. I doubt anyone can and ever will. That is what makes MSU great. I can say that I have met most, if not all, of my goals I put forth on Day 1. I am funded by the National Science Foundation (CAREER and Arabidopsis 2010), the USDA through a Specialty Crop Research Initiative grant, the Pickle Packers International Agriculture Research Fund, and MSU Project GREEEN. My lab works hard, and we are having fun. I can honestly say at the end of all of this, “I am pleased with our successes, and looking forward to building upon these in the future!”.
In this document, I summarize my achievements and future plans in teaching, research, and service at Michigan State University (MSU) for my tenure case.

**Becoming a Construction Management Scholar**

"The whole secret of life is to be interested in one thing profoundly and in a thousand things well." - Urooece Walpole

During graduate School, I found Construction Management to be full of simple and powerful ideas, clever techniques, challenging projects and problems. But the experience of graduate school did more than just convert me to a learned construction manager. It made me realize that I have a knack for sharing information about construction management and making it more accessible to a wider audience. I also recognized, through research assistantships and professional experiences, how much I enjoyed the discovery and application of new ideas, methods, and techniques. This affinity for teaching and research crystallized into a professional aspiration of becoming a bona fide scholar of teaching and research in Construction Management. Therefore, I left a secure position at Ford Motor Company to join the Construction Management Program at MSU as an assistant professor.

Upon joining MSU, I realized that the scholarship I have been trained to do at the University of Michigan contained two basic features (Diamond and Adam 1993)¹:

- The activity requires a high level of discipline-related expertise, breaks new ground, is innovative, can be replicated or elaborated, and has significance or impact.
- The work and its results can be documented, and can be peer-reviewed.

This definition of scholarship was disheartening to me because it seemed to encompass only one type of scholarly pursuit (that of the discovery of new knowledge), at the expense of other forms such as teaching. This was particularly important to me because I had no prior teaching experience and I wanted to be the best teacher that I could be. As a consumer of great and terrible teaching, I thought I knew exactly what my teaching should be, but quickly realized that I didn't know how to do it in a genuine and authentic way. I intuitively believed that the way to approach pedagogy should be no different from approaching research problems, i.e., through the scientific process. This meant I have to be a scholar of teaching as much as one of construction management, However, I have long heard that in academia, instruction does not get the same rewards as disciplinary scholarship.

I found solace after reading the reference "Scholarship Reconsidered: Priorities of the Professoriate" by Ernest L. Boyer², wherein he defined the following forms of scholarships: Discovery, Integration, Application, and Teaching. To me, Boyer captures the epitome of scholarship, one that is observed and practiced in every aspect of academic life. That is the type of scholarship I have been working towards in the past five years and look forward to continue pursuing at MSU in the future.

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Teaching at MSU

"Education is not to teach men facts, theories or laws, not to reform or amuse them or make them expert technicians. It is to unsettle their minds, widen their horizons, inflame their intellect, teach them to think straight, if possible, but to think nevertheless." Robert M Hutchins.

I believe that each teacher has to arrive at his/her own style of instruction that is commensurate and compatible with their own personality. I, therefore, worked on a statement of teaching philosophy to guide me in the design and delivery of instruction. Basically, I am fully in favor of a topic-based approach where students and teacher all form a "circle" around the topic and have vigorous discussions about it. I also want every student to leave my class at the end of the semester saying, "I didn't know that I could work so hard, and I didn't realize that I could learn so much," Anything less is unacceptable. Upon sharing this position on teaching in the first class, students are typically not sure how to react to because they have been socialized to be passive learners during most of their education years. An open discussion regarding this philosophy helps them to realize how it will be achieved.

My teaching assignment in the program has been the undergraduate and graduate courses on construction scheduling, BCM411 and BCM811, respectively. BCM411 is offered as a 2-hour lecture section with multiple 2-hour lab sections, BCM811 is similar to the 411 model. Also, as part of my teaching assignment, I was to develop a new graduate course on a topic of my choosing. I have developed this course and it is titled "Lean Construction Principles and Methods". The course has been well received by students and will become a regular course offering as of the academic year 05/06. During the academic year 04/05, I also taught the Commercial Capstone course, BCM436, and supervised the Professional Internship class, CMP493, The average SIRs score I received in all the classes I have taught at MSU is 1.4 (1 = superior and 5 = inferior), and the range of the SIRs scores received was between 1.18 and 1.86.

As I continued to attend more and more teaching seminars at MSU and through independent readings, my curiosity about the scholarship of teaching and learning grew. Consequently, during the academic year 02/03, I applied and was accepted to the MSU Lilly Fellowship program. The main goal of my Lilly research project was to enhance teaching delivery methods in the Construction Management Program through a study of teacher-student learning style disparity, I successfully completed the Lilly Fellowship year with a detailed report about the project I conducted and a published paper in the Journal of Construction Education -an on-line peer-reviewed journal published by the Associated Schools of Construction. Although I benefited tremendously from the project, the longer-lasting impact of the Lilly Fellowship on me was in the re-orientation and transformation of my perspective on teaching and learning that occurred through mentorship under Dr. Steve Yelon, the guidance of the Lilly leaders Dr. Karl Smith and Dr. Cathy Bristow, and the thoughtful conversations with the other Lilly Fellows.

Advising graduate students brings me particular enjoyment because of the immediate change and influence one can see in the students. My strategy in advising graduate students is to clarify early on what will constitute a win-win outcome for both of us. We discuss and agree upon the following five elements of a win-win agreement, which are adopted after Covey (1990)3: (1) Desired results (goal, objectives, and outcome); (2) Guidelines (boundaries and deadlines); (3) Resources (those needed against those available); (4) Accountability (measurements of progress and accomplishments); and (5) Consequences (what happens if win-win is achieved or not achieved).

Future Teaching Plan
Student feedback has been a great source of inspiration and validation for my efforts to improve my teaching. I regard the content I choose to teach as mostly quite fascinating, very exciting and fundamentally important. To me that this sense of fascination, excitement and importance is the core of much of what students respond to most positively in my teaching.

To date, I continue to work on improving class content and delivery methods to keep the students engaged and to direct classroom activities towards the development of critical thinking. I have also invited a teaching consultant to attend class. I also continue to attend teaching and learning workshops, symposia, or similar programs. My long-term teaching plans focus on experimenting with new teaching methods, and instructing in other existing courses and developing new ones. In addition, I am planning to pursue research in the scholarship of teaching and learning based on ideas from observations during and reflection after the Lilly Fellowship year. In particular, I am interested in developing a framework to assist students in arriving at better studying strategies based on their preferred learning style.

Research at MSU
"Do not go where the path may lead, go instead where there is no path and leave a trail."--Ralph Waldo Emerson

To me, research follows the motto of the Tiger Cubs (first level for Boy Scouts), which I helped my son commit to memory and practice: "Search, Discover, and Share". This Simple phrase helps my graduate students orient themselves to the process of research. It also provides them with a roadmap to what needs to be accomplished in their individual research projects.

When I arrived at MSU, I had an overarching research goal that was shaped by job experiences at Ford Motor Company. In particular, my training as a Lean Production subject matter expert made me recognize that the Construction Management field lacked a theoretical framework that was capable of fully explaining problems that arose in practice. In essence, the conceptual models of construction management were unable to consistently deliver on the mantra of completing a project on-time, on budget, and at desired quality. This inability was also evident from empirical data indicating that construction projects were low efficiency systems with high rate of injuries and fatalities, endemic quality problems, and rising litigation.

I surmised that the crux of the problem was in the production paradigms that dominated and guided the thinking about the construction process. I concluded that a paradigm shift was clearly needed in how construction as a process was conceptualized, similar to how lean production, as originally practiced by Toyota Motor Company and now by many others, evolved from craft and mass production. However, I was not convinced that construction management only needed an additive change; rather it needed one that was "ecological" wherein everything had to change.

Given that the scientific process is a social process, and not a solo adventure, I realized that this research goal cannot be achieved without the creation and involvement of an entire community of scholars. After a couple of months of critical literature review, I found that, as is always the case, other researchers were working on the same goal. The two primary entities that were active in research in this area were the International Group for Lean Construction (IGLC), formed in 1993 and the Lean Construction Institute (LCI), a non-profit organization that was formed in 1997. I immediately began the 'search' phase and read most of the available literature that both organizations produced also attended two workshops run by LCI that provided an overview of Lean Construction thinking and insights into teaching the topic in undergraduate and graduate
programs.

Since discovering this community of researchers and practitioners interested in changing what we build and how we build it, I have been intrigued by the study of construction projects as project-based production systems. Another term for project-based production systems is Lean Construction wherein production is conceptualized in three complementary ways, namely, as a Transformation (T) of raw materials into standing structures, as a Flow (F) of the raw material and information through various production/assembly processes, and as Value (V) generation and creation for owners through the elimination of value loss (realized outcome versus best possible) by ensuring customer needs and wants are captured and challenged.

Lean Construction principles inform and guide my primary research interests in the discovery, exploration, and application of new theories and methods to:

(1) Protect and safeguard construction workers from occupational injuries and fatalities. Specifically, I am interested in the following three main topics of research:

- Prediction techniques for physiological demands during construction work.
- Construction worker’s hazard perception models.
- Construction Accidents Causation models.

(2) Develop construction production planning and control models.

After five years of working according to the research plan outlined above (tracks A and B), I have supervised 7 Plan A masters students (with 5 completed), published 4 refereed journal articles, 2 paper closures, and 17 refereed conference papers, and 2 research reports. A search on Google's scholar database (http://scholar.google.com/) reveals that my publications have been cited in 14 scholarly works (excluding self-cited work), and listed as recommended readings on a number of sites.

I have also received a 3-year NIOSH grant in the amount of $143,173, a one-year Consumers Union Southwest Regional Office- Manufactured Housing Research Initiative grant in the amount of $45,000 (co-investigator). In 2004, I was extensively involved in the launch of the Lean Construction Journal (http://www.leanconstructionjournal.org/), an on-line peer-reviewed journal published by the Lean Construction Institute. I currently serve as co-editor for the Lean Construction Journal and as chair of the Lean Construction Institute Academic Forum. I also review for 10 different peer-reviewed journals and conferences (to date, I have reviewed a total of 76 papers).

Future Research Plan

"Just because something doesn't do what you planned it to do doesn't mean it's useless." --Thomas A. Edison

During the past five years, I have developed 9 full proposals based on findings from the NIOSH grant, the Consumers Union project, and various Master’s theses, as well as numerous pre-proposals. While these proposals were not successful, I am learning valuable lessons from writing each one, specifically from the peer-review feedback received. For example, I realize now that on large grants, the presence of two or more principal investigators, both from MSU and from other institutions, is critical. In addition, I have learned that establishing a professional working relation with the granting agency is equally critical, e.g., through presenting seminars about ongoing research efforts and engaging agency staff early-on in
discussions regarding the relevance and significance of the proposed research topic to the agency's research priorities. I also need to target smaller grants offered by construction trade associations and other professional associations, which will create a track record that would be valued by federal and state funding agencies. These grants will also allow me to focus on a particular construction domain wherein I can apply and focus my disciplinary expertise (occupational safety and production planning).

In the years to come, I will continue to conduct research in the two tracks mentioned earlier. This is not in defiance or denial of the outcomes of my grant seeking efforts thus far. This is primarily driven by the fact that all the proposals I have submitted have been found to have merit. However, without compromising my idealist views and belief in the power of ideas in changing people and the world, my approach will be vastly different in seeking funding based on the lessons learned explained earlier. I believe also that the launch of the Construction Management PhD program in fall 2005 as well as the planned addition of more faculty to the program will help tremendously in being more prolific in scholarly pursuits and more successful in grant-seeking activity.

I will continue to establish strong presence and name recognition in Construction Safety and Lean Construction through publications in peer-reviewed journals and attending conferences, conventions, professional meetings, colloquia and seminars. I also intend to organize/chair/host conferences on Construction Safety and/or in Lean Construction at Michigan State University.

As of the writing of this statement, the following is brief listing of ongoing and planned research projects:

Current Projects:


Future Projects:

- Assessment of Alertness Levels During Construction Work Activities Using Ambulatory Electroencephalography (EEG)
- Ergonomic Evaluation of Manufactured Housing Production Operations.
- Validation of Energy Expenditure Production Models for Construction Work Activities
- Work-Rest Cycle Management to Improve Worker Performance In Construction
- Production Planning Assessment During Manufactured Housing Installation Operations Using Lean Production Principles
- Improving quality of pre-fabricated wood truss elements using Six-Sigma techniques

Service

"One act of beneficence, one act of real usefulness, is worth all the abstract sentiment in the world" -Ann Radcliffe

I enjoy working with students and colleagues on matters important to the program, college, and university. Interaction with industry through outreach has also been a
source of great insight and validation of the importance of the research ideas that I am pursuing.

In general, my approach to service is the same as my approach to teaching and research. Regardless of the service engagement, I find delight in researching the topic(s) at hand, identifying a strategy to address issues, and bringing rigor to the process and outcomes. An example of this is the outreach project that the Construction Management Program (CMP) was requested to develop by Haworth, Inc. (a Michigan-based manufacturer). The project consisted of development and delivery of five 4-day construction management workshops, to be offered in 2005. I served as the project manager for this outreach program. In that capacity, I developed the program proposal (including content, delivery formats and structure, and budgets), and coordinated and managed training logistics, training materials, and instructors. In working with my colleagues on selecting content and delivery formats, I read available literature on andragogy because of the type of audience we expected to have. I found it interesting to see how the learner, the learner's experience, readiness to learn, and orientation to learning have been portrayed as having different characteristics in pedagogy compared to andragogy (Hanson 1996). These factors were all taken into consideration, and Haworth considers this program as one of their best offerings. This outreach project generated $115,000 in revenue to CMP. Another round of workshops is being seriously considered by Haworth for 2006.

In the future, I will continue to participate in all dimensions of service when requested as well as proactively seek and engage service opportunities and develop outreach events for professionals.

Final Thoughts

"Not everything that can be counted counts and not everything that counts can be counted."—A. Einstein

After five diverse, challenging, emotionally and professionally enriching, and rewarding years at MSU, I believe that my efforts are consistent with the forms of scholarships described by Boyer (1997)—Scholarship of discovery, integration, application, and teaching. I believe that my accomplishments reflects this by showing: (1) a demonstrated record of effectiveness as a teacher; (2) a record of peer reviewed publication and peer-reviewed creative activity which has contributed to the field of Construction Management, to my intellectual development, and to the quality of the Construction Management Program; (3) a record of professional service, which is proportionally appropriate to my appointment, to the program, college, university, and the construction industry; and (4) promise of growth in teaching and research.

No one, at least among the people I know, springs full-grown from the brow of Zeus. I came to MSU capable of certain things and full of promise to do others, and I am getting better at the time. I am very proud of what I have been able to accomplish at MSU. I realize I need to, and I will, bring my grant activity to be on par with my scholarly productivity in teaching, research, and service. I believe that I am on track towards fulfilling my overriding mission of spreading and

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contributing to the body of construction knowledge as a teaching and research scholar of Construction Management. That is why I look forward to being a part of Michigan State University.
Twelve years before the mast: A voyage in academia

A reflective essay

Submitted in association with application for promotion to full professor

Steve van Nocker, Ph.D.
Department of Horticulture
October, 2011

In Dana's famous novel, Two Years Before the Mast, Narrator flees a life in academia and takes his readers on a sea journey traversing the breadth of the globe and lasting a full two years, describing various highlights of a typical mid-1800's sailing voyage. The story is told from the forecastle - the dirty, wet, cramped area in the bow where the common sailors must live. My essay below is neither a travelogue of my somewhat longer (albeit geographically more limited) tenure at the Department of Horticulture at MSU, nor an attempt to allegorize my position with that of the reeking sailor in the forecastle (that being off point) (and unwise considering the goal that this task would serve). Rather, my intention is to narrate the breadth of my activities as an Assistant and Associate Professor, while highlighting those that I feel have had, and will have, the greatest impact on science and society, those that have affected me most profoundly in my outlook, and those that I believe offer unique and novel contributions to MSU, in the areas of research, teaching/mentoring, and service. I also take this opportunity to discuss the future heading of my program and where I believe I will take it in the next decade.

First, however, note that my work can be most accurately described as Molecular Genetics of Plant Development, although it touches on several related disciplines (genetics, molecular biology, cell biology, biochemistry, plant physiology, to name a few). I will attempt to define. Development (biology) is thought of as the origin of form as an organism grows, and in plants includes many aspects such as seed germination, leaf formation, flowering, and fruiting. Genetics is understood as the study of genes - how they function and how traits are inherited. Molecular genetics is distinguished by the study of the molecular aspects of genes - including how genes are made to produce RNA and proteins, or mechanisms by which genes are regulated. Thus, my work centers on how plant genes are regulated to drive formation of plant parts during growth. This concentration is nearly unique within the plant sciences at MSU.

With that introduction, and because I was appointed with primarily a research position (technically, '80% research' and '20% teaching'), I will embark with Reader in this area. I have been fortunate in finding a position that not only requires combining fundamental with applied research, but that also offers a tremendously positive and rewarding setting in which to pursue and integrate these.
I first highlight my research in the area of chromatin. Chromatin is the combination of DNA and the proteinaceous matrix in which the DNA is packaged. This packaging is essential to fit long DNA molecules into the nucleus, but also poses obvious challenges for mechanisms that depend on access to the DNA—such as gene regulation. The bulk of chromatin proteins are the histones, and histones can be subject to numerous kinds of post-translational modifications. In 2008, we published a report that included the first full, genome-wide integrated map of several specific histone modifications for any plant (Oh et al., 2008). Through this work, we found that specific types of histone modifications tend to be part of the packaging for specific types of gene, and for specific regions of genes. This was a high point in my career not only because of the potential impact of the finding, but because we also incorporated several new and challenging molecular and biocomputational tools to obtain the data. Besides its publication in a trendy, new high-impact journal (an article that has been viewed nearly 3,000 times so far), this research has led to awarding of a major, single-investigator grant from National Science Foundation (NSF). This type of work can be directly exploited to facilitate sequence analysis of gene-rich regions in plants with complex genomes, to improve genome annotation, and to uncover cryptic and previously unanticipated features of the genome. Currently, with the NSF grant, I am making excellent headway in each of these three areas, and plan to stay this course for at least the next ten years.

A second summit of my research work has been in the area of (so-called) transcriptional memory. This term refers to the maintenance of patterns of gene activity during cell division. Proper ‘memory’ of gene activity is required in order to establish tissues (fields of cells with the same function), whereas this memory must be suspended for cells to assume new identities and functions. Regulation of the flowering inhibitor gene FLC in the reference plant Arabidopsis thaliana has become a model for the study of this process. In some natural strains of Arabidopsis, FLC becomes silenced during growth in cold, leading to flowering (the well-known phenomenon of vernalization). Over the past ten years, we identified numerous genes required for the maintenance of FLC gene activity, and characterized how these genes function. We found that many of these genes encode protein subunits of an enigmatic transcription cofactor, termed PAF, that is evolutionarily conserved, existing also in yeasts, humans, and other higher organisms. We now know that PAF links mechanisms that promote gene activity with machinery that modifies the chromatin environment of the FLC gene. This provides a potential explanation for transcriptional memory in this case. I highlight this project partly because of its impact, but also because it demonstrates a focused, persistent effort over nearly the full span of my work at MSU (van Nocker and Ransom, 2002; Zhang and van Nocker, 2002; Zhang et al. 2003; Oh et al. 2004; Oh et al. 2008; Park et al. 2010; 2011). Having established this core body of knowledge, I will continue to develop this over the next decade, while expanding the work to attempt to understand how this mechanism might function for other genes and other developmental transitions.

How can study of fundamental mechanisms of molecular genetics of development be applied, especially to Michigan horticulture? Some of the most significant production problems in tree fruit crops (of paramount importance to Michigan horticulture) are rooted in development. Flowering and abscession provide excellent examples. In the domestic
apple, the initiation of flowers is inhibited by developing fruit. Because in apples (similar to many trees) flowers are initiated in one year and then complete development (and bloom) the following year, large numbers of developing fruit can suppress initiation of flowering (thus lowering fruit load) the subsequent year. This phenomenon, termed biennial bearing, is of tremendous importance to the apple industry, because fruit must actually be removed (thinned) in order to ensure flowering the following year. Effective fruit removal requires accurate manipulation of abscission – the natural tendency of the plant to retain or drop fruit. However, there is no manageable way for growers to do this in the field, and biennial bearing remains a severe limitation to production and growth of the industry. Studies of the underlying genetic mechanisms of flowering and fruit abscission will allow us to chart a course forward to sophisticated methods of control (potentially involving undiscovered signaling molecules) and to engineer novel varieties (through traditional breeding or biotechnology) in which problematic traits are suppressed.

Within the next ten years, biology will include the field of developmental engineering – using biotechnology not only as it has been commonly applied – to alter biochemistry or pest resistance – but to engineer new forms of plants. This will require better knowledge not only of the developmental processes themselves, but how the associated genes are regulated and can be manipulated. Above I give but one example. However, the opportunities to apply such studies to agricultural problems are essentially limitless. In addition, the nature of our global economy will increasingly require development of international approaches and teams to tackle such issues. I have so far forged strong collaborations with researchers in Great Britain, Germany and Canada. I look forward to maintaining these collaborations while expanding my activities to developing countries as well.

I note that my appreciation for horticultural production problems has developed almost entirely from my personal interactions with industry, and the opportunity for such interaction is a very positive aspect of my position. I have found growers to be exceptionally knowledgeable and sharp, engaged, and most of all supportive of my work. My positive interactions with growers are reflected in my consistent track record of industry funded research grants, and maintaining these interactions is a high priority for my program.

My experience in the area of teaching and mentoring has been not only very productive, but extremely rewarding. The high point here was my development of a new course, Plant Developmental Genetics, that covered topics that were not available elsewhere at MSU (note: the course was rolled into Jan Zeevaart’s Plant Development (PLB865) course upon his retirement, and is now team taught by myself and Dr. Jianping Hu in the Department of Plant Biology). The course is now part of the curriculum for multiple graduate programs, and attracts a consistent audience of very interactive and bright graduate and undergraduate students. I have had numerous opportunities to disseminate findings from my research in the areas of flowering and chromatin biology in this class; the ensuing discussions with students have had a definite impact on the trajectory of my research. My portion of the course includes entirely web-based content, and I have experimented with various web media to enhance teaching (eg. Twitter: students find that to answer a
question using exactly 140 characters, or about 20 words, they must truly understand the material]. I have found that this internet-based media is an excellent tool for engaging those students (typically about a fourth of my class) who have difficulty participating in a classroom setting. With additional training in web authoring, I hope to expand the course website to provide a clearing house of plant development-related educational resources.

I offer teaching this course as a high point not only because it fills a hole in the plant science curriculum at MSU, but also because it has contributed greatly to my development as an instructor. In my first attempts at teaching this material, I found it intimidating to face an audience of graduate students, some not much younger than myself. In the ensuing years, I have come to view teaching not so much as a one-way means for instilling knowledge, but instead as a venue for sharing of information and experiences among colleagues. I believe that the students appreciate this, and that this has led to wonderful dynamics in the classroom. In addition to this core course, and as I have done in the past, I will continue to offer a variety of additional, special topic and seminar courses that center on development, while also touching on topics that address needs of the MSU plant science students and exploit unique educational opportunities as they arise.

Another high point in this area is my mentoring activities with undergraduates participating in research in my lab. I first employed undergraduates in a research setting several years ago, in response to an initiative from the Provost's Office to 'expand the teams of undergraduates and faculty participating in research'. Although I was wary at first, I quickly learned that, properly mentored, undergraduates can be quickly trained and can be very productive lab members. I now offer a very structured experience for undergraduates in my lab, involving proposal and report writing, formalized training in lab techniques and safety, exposure to responsible conduct of research and other issues, and presentation/publication opportunities. I believe that a position in my lab is highly desirable, as I have received over 30 applications in a semester. A memorable reward for my mentoring efforts was seeing one of my students (L. Rin, Lyman Briggs College) receive the Grand Prize in Science and Engineering for her presentation at the University Undergraduate Research and Arts Forum. It is my hope that my mentoring structure for undergraduates in research can be widely adopted.

Regarding service, perhaps my best moments have been as the coordinator of the College of Agriculture and Natural Resources Undergraduate Research Program, a position that I held since the inception of the Program in late 2006 until just recently. Organized by then-Associate Dean Eunice Foster in response to an initiative from the Provost's Office to stimulate undergraduate research at MSU, this Program has so far supported over 200 students and faculty in team research. As coordinator, I worked with Dr. Foster and led a faculty committee to establish structure for the program, mediate application and awards, track progress and outcomes of projects, and develop seminars and workshops for participants. This position also resulted in my participation as College representative in many other undergraduate research-related activities and programs at the University level. I believe that my efforts in this area have played a significant role in establishing an undergraduate research culture in the College, and that they will reflect MSU very positively through placement of well-trained and knowledgeable undergraduates in
professional and graduate positions at institutions throughout the country and around the world. Although I will miss this position, I recognize that there are numerous opportunities for building similar Programs on campus, and for utilizing undergraduate research as a building block of grant proposals and curriculum establishment, and I will use my experience in this area as a compass to direct me forward in such efforts.

A second 'best moment' in service that I would like to mention is my participation in the University Academic Integrity Review Board. In truth, the Board was seldom convened. However, the cases that we reviewed were always extremely thought-provoking and controversial (by nature, since the Board was the final arbitrator of cases that could not be resolved at the Department or College levels). For example, in 2010 the Board met in special sessions, in which I acted as Chair, to review a case in which a student challenged a failing grade given by a faculty instructor as a consequence of cheating (as interpreted by the faculty). In the end, the case was balanced on the question: To what extent does a faculty member have unlimited authority to define the action of cheating? The case not only had obvious consequences for the career of the student and reputation of the faculty member, but also helped to establish precedence in what seems often to be a very gray area.

In all of this I have demonstrated a strong commitment to diversity and inclusiveness. This encompasses significant efforts, such as actively participating in the Multicultural Apprentice Program that targets underserved students, or learning Spanish through a four-week intensive course in order to communicate my work bilingually when the opportunity arises, but also small steps, such as ensuring that posting for new positions are distributed broadly. I believe this commitment has had numerous and very positive impacts on both my team and the University. I envision expansion of such activities in the future. I am currently in discussions with a former postdoc of mine, Maria Julissa Ek-Ramos, about how she and I can build such a pipeline from recruitment at the K-12 level to undergraduate/graduate success.

My yarn ends as Reader may grow weary and as we swiftly approach the page limit. In summary, my voyage as a faculty member in MSU Horticulture has been exciting, interesting, enjoyable, and (I believe) highly productive and significant. I now look forward to the new challenges and opportunities that accompany a promotion to full professor, not only on campus, but literally to all corners of the globe.
Sieglinde Snapp

Reflective Essay
(August, 2010)

My faculty position in the Kellogg Biological Station (KBS) and the Department of Crop and Soil Sciences (CSS) has proved to be an ideal fit. The work is productive and rewarding, with outstanding research facilities and unique opportunities to collaborate at KBS and beyond.

My initial faculty position at MSU was as an Assistant Professor of Integrated Vegetable Crop Management, hired in 1999 and promoted to Associate Professor in 2004. My research and extension responsibilities were in agronomy of potato and vegetable systems. I enjoyed the position: it was a tremendous opportunity to learn and engage with extension educators, industry and growers in Michigan and beyond, and to apply ecological principles to real world challenges in horticulture. I developed a number of multidisciplinary projects, and succeeded in promoting integrated nutrient management for more sustainable production practices. In 2005 I was ready for new challenges and I applied for my current position of soils and cropping systems ecologist. I was thrilled when I was offered this position in 2006. It has been - and continues to be - a unique opportunity to make a difference in agroecology, as a co-PI on the LTER, as a KBS faculty member, and through collaborations with colleagues to extend ecological knowledge.

Integrated, inquiry-based research, teaching, and extension

My position offers a balance of research, teaching, and extension. This is an excellent fit with the integrated approach I use, where research informs my teaching and extension, and vice versa. Engaged, participatory approaches to learning are at the foundation of my program. This is in synchrony with MSU’s goal to produce life-long learners. A few examples follow, with papers cited listed in my vitae. In teaching I have set up inquiry-based learning opportunities, in courses such as CSS 360 Soil Biology and CSS 431 International Agricultural Systems. In CSS 360 I devised a laboratory exercise where students designed a greenhouse experiment to investigate interactions of soil organisms and plants. Over time I fine-tuned the degree of guidance I provided in this lab, so as to provide enough structure while promoting student exploration. Student feedback has been fundamental in this evolving process, and has indicated that for some students this has been a memorable experience; it has opened new horizons for them as they developed and tested hypotheses, followed through and shared what they learned. The lab was informed by research I have conducted 011 cover crop traits and soil organisms, quantifying impact on soil biophysical properties and root health (Snapp et al., 2007; Wilke and Snapp, 2008). Colleagues have adapted the lab procedure for their own
Engaged activities and promoting inquiry-based learning has been the core of my extension program as well. In the 1990s I worked as a soil scientist based in southern Africa where I promoted the systematic linkage of long-term experimentation at research stations with farm based experimentation. I have continued this approach at MSU, where I have had the opportunity for extensive collaboration with agricultural economists and social scientists to facilitate stakeholder involvement, through surveys, advisory boards and on-farm experimentation. These approaches promote communication and co-learning, with gains in research relevance through systematic feedback from farmers and other stakeholders (Snapp et al., 2002; 2003; 2005; Snapp, 2004). I have published on these client-oriented, participatory research methods, including the 'mother and baby trial' design (Bezner-Kerr et al., 2007; Snapp, 1999; Snapp and Heong, 2003).

A number of plant breeders and agronomists have cited the 'mother and baby trial' methodology as being key to breakthroughs in developing varieties preferred by farmers, and testing integrated use of genetics with resource-conserving technologies (e.g., Virk et al. 2009. Experimental Agric. 45:77-91; http://engagedscholar.msu.edu/magazine/volume4/snapp.aspx). The design facilitates the systematic integration of farmer and researcher assessment of technologies through linking on-farm and research trials in a lattice statistical design or using mixed modeling REMI. Uptake of new varieties by response-poor farmers in rain-fed systems of sub-Saharan Africa and South East Asia has been rare; what some have called the forgotten farmers by the first green revolution. Reports of 15 to 70% yield gains among smallholders, and dozens of new varieties being adopted in combination with sustainable management, are tributes to the power of the interdisciplinary, participatory approaches that I have helped pioneer¹, Participatory research and extension methodology is still under development, but shows promise as a means to address biocomplex, real world problems, MSU has leading scientists working on methods that address coupled-human natural systems, and this is a perfect fit for my program.

Research

Throughout my career I have been interested in the under-explored world of the plant-soil interface in row crop ecosystems, at scales from plant to field, Recently I have become interested in scaling out over space and time) to investigate consequences at the watershed and regional scale of different intensities of management and types of plant species present. My position at KBS is ideal for

learning about how biogeochemical processes in nutrient management and soil quality operate at different temporal and spatial scales. Since 2006 I have been one of the principal investigators on the NSF-funded Long-Term Ecological Research (LTER) row crop ecology project at KBS, with a focus on agroecological processes and agronomic practice. Long-term research trials provide unique insights into system performance and nutrient cycling at different states, transitional and equilibrium, I am particularly interested in whole system comparisons, and have used ecosystem services, profitability and energy budgets as creative ways to evaluate system performance (Gelfand et al., 2010; Snapp et al., in review).

I initiated a temporal experiment in the Living Field Laboratory, a satellite trial I manage at the LTER-KBS. This has been instrumental in testing how management practices alter equilibrium, through feedbacks that influence plant N fixation and soil C and N pools over a decade or more, This novel opportunity has facilitated my interaction and collaboration with internationally known researchers, including Laurie Drinkwater at Cornell University. I have been fortunate to work with her and colleagues on an NSF-funded project investigating cropping system interventions to retain N and protect water quality while reducing greenhouse gas emissions (Drinkwater and Snapp, 2008; McSwiney et al., 2010).

Expanding our understanding of biological processes involved in soil carbon sequestration, nitrogen dynamics, crop growth and yield potential is at the core of my research program, and is the basis for the sustainable practices I promote. This was the foundation for my previous applied position in horticultural systems at MSU, and for my current research. Investigating interactions involved in organic and inorganic nutrient management led to my research on how “recoupling” carbon and nutrients through utilizing compost and cover crops can have plant-health implications as well as environmental benefits. This was the basis for widespread adoption by Michigan potato farmers of compost and an array of cover crops, for high quality root systems, tubers, improved soils, and lower agro-chemical costs (Po et al., 2009; 2010; Snapp et al., 2005; Snapp et al., 2007).

I am particularly interested in plant-soil processes and management practices that buffer the N cycle and release temporarily captured (immobilized) nitrogen at a measured rate. This is proving essential to improve nutrient management, and efficiency, I have been fortunate to work with a talented team of students, technicians and postdoctoral scholars to pursue these questions at KBS, leading to recent publications in journals such as Ecological Applications and Agriculture Ecosystems and Environment (McSwiney et al., 2010, Snapp et al. 2010). We are documenting the role of coupled carbon-nutrient sources as an underlying principle of sustainable and organic row crop production practices. This is in addition to the role played by crop diversity from cover crops and rotation sequences.
The role of 'perennialization' in row crop systems is the other central sustainability principle that I am investigating. This term refers to extending the duration of living cover through choice of species type for cover crops and cash crops. In both temperate and tropical corn-based ecosystems we have found that perennial cover reduces excess nitrate leakage, and may support climate stabilization by contributing carbon to stable organic pools (Snapp et al., in review; Snapp et al., 2010). Uniquely, colleagues and I have documented in a country-wide experiment in Malawi that soil C status and nitrogen fertilizer efficiency can be improved through perennialization, diversifying corn with pigeonpea and other multipurpose, long-lived legumes (Beedy et al., 2010). We term this novel technology 'agrosrubbyry'. This was developed through cropping systems, participatory research and evolved with a specific set of traits different from agroforestry systems. Based on input from social and biological science, we document a unique role for legume shrubs and vines that provide a wide range of ecosystem services to ensure farmer acceptability, including nutrient-enriched grains as well as soil-building residues. In combination with moderate fertilizer doses, improved fertilizer efficiency and yield stability from agrosrubby systems could provide multiple, nutrient rich sources of grain and lead to a more 'green' revolution for smallholder farmers (Snapp et al., in review).

At K13S I have initiated a multi-disciplinary approach to test and deploy perennialized varieties of annual crops, including the promising new crop 'perennial wheat'. This was recently supported by a million dollar USDA-OREI grant and has lead to my collaboration with pioneering researchers working on developing perennial grain cropping systems, with potential for profound improvements in food and environmental security (Glover et al., 2010 Science 328:1638-1639). The LTER at KBS is an outstanding opportunity to develop a more perennial type of row crop system, that can enhance soil C and N retention, without undue loss of yield potential. I am particularly excited about the directions the LTER-KBS is planning for the next phase of research, including investigating the potential of perennialization, and exploring the social and biological science interface, which are areas of abiding interest to me. Investigating the impact of ecologically-based management at scale in terms of yield tradeoffs with other ecosystem services is LTER research is a new area of research in my program, funded in part by an EPA-funded grant with Sasha Kravchenko. These are examples of the exciting directions that we are pursuing at KBS, which are a perfect fit with my future research interests.

Extension

It is an extraordinary privilege to have a position that combines ecology with an explicit extension responsibility (25%). It is a great pleasure to interact with MSU
Extension educators, and I have been fortunate in the collaborations I have developed with extension from across the Midwest, with farmers, and with a diversity of farmer organizations (e.g., Midwest Organic and Sustainable Education Service; Corn Marketing Program of Michigan; Michigan Organic Food and Farm Alliance; and Soil Food and Healthy Communities). The research projects I have developed while at MSU have all included extension specialists and educators, agricultural advisors from private and public sectors, working closely with scientists from natural and social science disciplines. It is my experience that real world problems require time invested in communication across disciplines. It requires full integration of research and extension, as well as iterative learning that enhances research and outreach as a project evolves. Through these approaches) have played a key role in solving problems as diverse as a fruit cracking disorder afflicting the Michigan tomato industry (Huang and Snapp, 2004; 2009; Snapp, 2005) to practical cover crop options for row crop production (McSwiney et al., 2010; Snapp et al., 2005; 2010).

My goal in developing extension materials and programs is not so much to develop recommendations as to promote learning about ecological principles by extension educators, and farmers. As an example, MSUE staff and the farmer advisory board of the Corn Marketing Program of Michigan have recently expressed interest in how to maintain soil quality in the face of emerging markets for crop residues. My response has included developing extension training materials (Doll and Snapp, 2009; Snapp and Grandy, in press) and participating in MSUE programs around the state to reach hundreds of farmers. In these educational materials and presentations I have not developed recommendations on levels of residues that can safely be removed; rather, I have synthesized findings from the literature to articulate the underlying science of how residues influence soil organic matter formation, and conserve soil, while sometimes temporarily immobilizing nutrients. I have also used recent research from my field trails to quantify tradeoffs, to elucidate plant-soil processes involved, and to urge farmers to make informed management choices.

Promoting on-farm assessment of soil quality, by farmers and agricultural advisors from the private and public sector, is another aspect of my extension program. Working with a Soil Science Society of America committee on field monitoring, I published a chapter on step-by-step evaluation of soil quality, including biological, chemical and physical tests that can be conducted at a field scale (Snapp and Morrone, 2008). I am committed to providing tools for extension and farmers to carry out lifelong learning, in the spirit of Professor Liberty Hyde Bailey, and the Bailey Scholars program at MSU.

*Instruction and graduate student mentoring*
Promoting ecological knowledge among agricultural students is core to my teaching interests. I was instrumental in developing two new specializations in the College of Agriculture and Natural Resources-MSU which were just approved in 2009. These are Sustainable Agriculture and Food Systems (http://www.safs.msu.edu/, undergraduate) and Ecological Food and Farming Systems (www.effs.msu.edu, graduate). Twenty plus students are in the SAFS program, and the first EFFS student just graduated in CARRS, with six more enrolled. I enjoy working with and supervising the academic specialist responsible for promoting these new programs, which are poised to grow quickly and meet the demands of a 'greening' student population.

The three courses I have taught at MSU are CSS 360 Soil Biology, CSS 431 International Agricultural Systems and CSS 893 Sustainable Agriculture Field Methods, a summer intensive graduate course at KBS. I co-developed CSS 360 with Robertson, and co-taught it until recently when I was asked to re-envision and teach CSS 431 in the spring of 2009. This course is an excellent fit allowing me to draw upon my extensive African agricultural systems experience, and my abiding interest in applying the lessons of applied ecology to rural development. This led me to publish a book—which I co-edited and wrote extensive sections of—for use as a course text book (Snapp and Pound, 2008). Student evaluations were high, consistently below 2 on a scale of 1 to 5. The field methods course is also new, and had an enrollment of 10 motivated graduate students when I offered it in the summer of 2008. It was a very enjoyable course to teach, with high student participation in defining research methods and approaches to explore. It used to advantage the KBS field station tremendous diversity of ecosystems as opportunities for student projects and demonstration of above and belowground agroecology methods. Student evaluation scores were very high.

I have led a number of graduate and undergraduate seminars, with topics such as international agriculture, soil organic matter dynamics, plant mineral nutrition, participatory methods, sustainable agriculture and “Eating Green in Michigan” a UGS 101 Freshman Seminar. These have been student initiated or highly participatory and wonderful opportunities to engage with students on topics of mutual interest.

Mentoring students is one of the most satisfying aspects of my job. I have served as major advisor to 12 graduate students, in addition to the three I co-advised at University of Malawi pre-MSU, and three students who just joined my laboratory. My students often major jointly in CSS and Ecology, Evolution, Behavior and Biology (EEBB), a unique educational opportunity offered at MSU, and an enriched experience for my students at KBS. I am committed to supporting diversity in ecology and agricultural sciences through mentoring students from
underrepresented ethnic groups, which is reflected in the large number of undergrad and grad students I have mentored from diverse backgrounds (8 out of 21), and the successful outcomes in terms of 100% graduation, and their current positions (see my vitae). This has not always been easy, and I continue to learn how to adjust my advising to meet different student needs and learning styles. I am proud of having graduated two African women PhDs, who are now university lecturer and senior scientists in their home countries. I was recently chosen to be a mentor by a SEEDS fellow, which has been an outstanding opportunity to contribute to this diversity program.

Service

My service at MSU has reflected the interdisciplinary, integrated approach I take to scholarship. I have served on numerous search committees for faculty and extension educators, wearing diverse hats as the occasion merited, providing perspective as a member of the African Studies faculty, KBS faculty, or CANR faculty. I appreciate the opportunity to provide an agroecology perspective in my on-going advisory role to the director of the KBS, and as chair of the LTER-KBS agronomy committee. I have greatly enjoyed contributing to graduate education, through a formative role in setting up the new Ecology, Food and Farming Systems specialization, as the KBS representative to the Plant Science Recruitment committee and through service on the CSS Graduate Committee. I supervise the coordinator of the EFFS and SAFS specializations, and we are working to promote MSU’s strengths in sustainable food systems and agroecology to a broad audience of potential students. I have been part of several MSU initiatives to respond to international agricultural research and education opportunities, including a training of Gates senior staff, the Tanzania Sustainable Development Initiative and most recently as a team member of a successful USDA-HED grant to promote curriculum development and MSU linkages with University of Malawi. I anticipate that my service will continue to expand as part of the normal professional development of a faculty member.

I also provide service through my professional societies, including on-going roles as a rapid response team member to the American Society of Agronomy Executive Board, and as an Associate Editor for the Agronomy Journal. I look forward to providing leadership in the agroecology section of ESA as chair-elect, and related opportunities I am starting to pursue to build linkages between ESA and ASA. I am committed to expanding links between long-term agricultural experimentation and the NSF-funded LTERs (where I was just appointed to the International LTER committee).

Summary
My integrated program of scholarship, instruction and extension is closely aligned with the MSU vision of a world grant. Through understanding and promoting ecologically-based management, I aim to improve resource use efficiency and promote ecosystem services from agriculture. My research has elucidated sustainability principles such as the role “perennialization” and coupling carbon and nutrient management can play in row crop production. I seek to use participatory engaged approaches to extension and education to promote learning around these topics, and am excited to see expanded use of cover crops and integrated nutrient management in the Upper Midwest, and spatial diversity in the form of multi-purpose “agrosrrubbery” in southern Africa) where a greener revolution is starting to unfold.
“Biosensors to Save Lives”
Evangelyn C. Alocilja, Ph.D.
December 14, 2010

This paper summarizes my accomplishments for the reporting period 2005-2010. It also presents my vision for the next phase of my career at Michigan State University. In summary, I am committed to empowering students (mentoring), saving lives (research), enhancing curricula (teaching) and serving others (service).

Accomplishments

1. Mentoring

One of my passions in life is to empower young people to achieve their potential. During the reporting period (2005–2010), I mentored 20 undergraduate professorial assistants, 10 summer research interns, 15 senior design students, 13 high school students, 15 PhD students, 2 MS students, 3 post-doctoral research associates, 2 visiting scholars, and 2 public school teachers. I trained them in conducting research, writing technical papers, thinking critically, analyzing data, doing good laboratory practices, teamwork, and research presentation skills. Through my guidance, encouragement, and training, these students gained skills that made them competitive in vying for awards. I am happy to report that 3 undergraduate (UG) students received the Department of Homeland Security Undergraduate Fellowship, one UG received the Duvall Fellowship, 12 undergraduate students received awards during the annual University Undergraduate Research and Arts Forum (UURAF), 3 graduate students received the Department of Defense SMART (Science, Mathematics, And Research for Transformation) Fellowship, 2 received the Fitch Beach Graduate Student 3W8td, and several received BAE department awards. These awards bring distinction and honor to these students as well as to MSU and the department. I have also graduated 6 PhD and 2 MS students during the reporting period all of whom are currently engaged in jobs related to their earned degrees. My previous student's have performed well in their respective assignments. For example, Cynthia Meeusen (MS 2000) is now a Senior Controls Engineer at Disney World; Stephen Radke (PhD 2004) is now the account manager at JBT Technologies. These graduates, students, postdocs, scholars, and teachers will likely become innovation leaders in their respective areas of specialization. In all their future endeavors, they will carry the name of MSU and impact society in extraordinary ways.

As a demonstration of my collaborative and interdisciplinary approach, I also mentored 3 graduate students from other departments by providing technical guidance, financial support, and laboratory facilities to develop diagnostic biosensors directly applicable to their field of specialization. This approach has
encouraged true collaboration, resulting in jointly authored peer-reviewed papers and jointly funded projects, contributing to MSU’s brand of being a collaborative institution.

As evidence of my commitment diversity, I mentored a faculty-student team from a minority serving institution (MSI), in this case the Whittier College, California. This mentoring has led to the submission of a research proposal, and subsequent successful receipt of funding, to strengthen the MSI faculty’s research capabilities, facilitate MSI’s undergraduate research, and strengthen collaboration with MSU. This continued interaction will have long-lasting impact on the MSI and will expand the positive influence of MSU in the academic community.

My commitment to mentoring goes beyond the boundaries of MSU, I mentored 2 high school teachers to enhance their respective school’s science-based high school curriculum by providing lab facilities, materials, and technical guidance during the curriculum development. I am proud to report here that a curriculum on "Nanotechnology and Biosensors" has been developed for the Union High School in Grand Rapids, Michigan which graduates about 200 seniors per year. Another curriculum is currently being developed for the Jonesville High School, Jonesville, Michigan. Hundreds of students now and in the future will be impacted by these curricula. Similarly, I mentored 2 visiting scholars from outside the US. These interactions have led to more scholars coming. Again, this is a great way to expand MSU’s reach in the international arena.

As part of recruitment and service, I mentored 13 high school students, 9 of whom have won national and international awards, such as the Siemens Math-Science-Technology Competition, Intel Science Talent Search Competition, BIO Competition, and Presidential Scholars. These students will carry the name of MSU wherever they go.

2. Research

I like the challenge of pioneering. This is the story of the Nano-Biosensors Lab (NBL) at MSU. Before my tenure, this facility and the biosensors research program did not exist ram proud to report that NBL and the biosensors program have gained international prominence in such a brief period of time. I initiated (from ground zero), equipped, and strengthened the facility and program mostly from externally sourced funds, Most of the lab's work and accomplishments can be found in the following URL: http://www.eegr.msu.edu/~alocilja. My research program can be summarized in one word “Biosensors” and its mission is "to save lives". Within the broad field of biosensors, my niche area is developing field operable handheld nanoparticle-based biosensors for the point-of-care and rapid diagnosis of infectious
disease agents in resource limited and clinically-relevant field settings. We have synthesized novel I multifunctional reagents and developed accompanying biosensor devices that will allow for rapid "cradle-to-grave" diagnosis, that is, from sample handling to diagnostic results, within one or two hours. Our technologies have resulted in 3 US patents and 13 patent applications. As an indicator of international prominence, my paper was selected as one of 16 (out of 1200 submissions) to be a plenary presentation during the 2010 World Congress on Biosensors, held in Glasgow, UK.

Biodefense is a field that I am committed to. I am so glad that r have been given the chance to be part of the first team of investigators in 2004 to propose the National Center for Food Protection and Defense (NCFPD), now a Homeland Security center of excellence (http://www.ncfpd.unm.edu/), I am also part of the second team of investigators to work for the renewal of the NCFPD for the second term (2010-2016). NCFPD is a network of universities, federal agencies, and private companies committed to the protection of the US food supply system.

I find writing proposals as an opportunity to express my creativity. This interest has helped me generate external federal and state funds in the amount of $4.5 million for the period 2005-2010, These grants allowed me to conduct research on biosensors with applications in global health, biodefense, food/water safety, and product integrity. These grants also allowed me to mentor excellent students) publish papers, and attend conferences. These research expenditures contribute greatly to the national ranking status of the department, college, and university.

I like writing papers; it is a window for others to see what we do. For the period 2005-2010, I contributed 1 book (in review), 5 book chapters, 1 magazine article, 60 peer-reviewed journal articles and proceedings, and 69 research presentations. Several of the articles included undergraduate and high school students as co-authors. The impact of these papers on the biosensor and rapid diagnostic communities can be measured by the Hirsch index (h-index). For this report, I used the software "Publish or Perish"2 and Google Advanced Scholar h-index calculators; both evaluation tools gave the same result. As of September 15, 2010, my h-index is 15 and have received 768 citations with 26 citations/year. Furthermore, the most cited paper with 65 citations is a paper with only two authors: me and my graduate student. This paper is cited 8 times per year. The first 3 well cited papers, getting 50 or higher citations, have only two authors as well. These data show that my work on biosensors is useful to colleagues in the field. To put my scientific impact in perspective, I compared my h-index with that of two female

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1 h-index is a number system that "attempts to measure both the scientific productivity and the apparent scientific impact of a scientist" (http://en.wikipedia.org/wiki-index).
2 (Harzing, A.W. 2010. Publish or Perish, version 3 available at www.harzing.com/pop.htm)
colleagues (a full professor and an associate professor) in two institutions (Cornell University and Purdue University) who are in similar departments as I am and who do biosensor work. The associate professor is in a similar ten tire time frame as I am. The full professor has an h-index of 19 and 1,039 citations and 104 citations/year. The associate professor has an h-index of 6 and 118 citations and 3 citations/year. Furthermore, my citation is increasing exponentially with time as shown in Figure 1. All these data show that my scholarly work has contributed to the scholarship of other scientists and is highly valued by the scientific community.

Research impact can also be measured by the number of invitations to speak at prestigious meetings and conferences. During the reporting period, I gave 11 invited presentations. These invitations included those by the National Academy of Sciences and the World Congress on Biosensors. These speaking engagements bring national prestige and recognition of the research excellence on biosensors at MSU. Correspondingly, they bring national and international recognition to the department, college, and university.

One way to test the creativity and utility of a technology is through rigorous patent review. I am happy to report that together with my students, I received 3 US patents and made 13 patent applications. I worked I with the Office of MSU Technologies and various companies to potentially commercialize these biosensor technologies.

Through my research work, I have established international collaborations with the Canadian Food Inspection Agency, Canada; CIATEJ (Centro de Investigacion y Asistencia en Tecnologia y Diseno del estado de Jalisco), Mexico; Zhejiang University, China; University of the Philippines Los Banos; Tamil Nadu University, India; University of Baghdad, Iraq; and Frannhofer, Germany. I intend to continue these collaborations into the future.

![Citations in Each Year](image)

Figure 1. Citation Report by the ISI Web of Science, Author=(Alcilja E*)
3. Teaching

My latest achievement in teaching is developing 2 courses on biosensors and simultaneously laying the foundation for the BE-Biomedical Engineering (BE-BME) concentration for the BE students. Before this initiative, our BE-BME students did not have a BE-BME course in the department. Now, we have our own course which differentiates and provides uniqueness to our students. The BE-BME concentration prepares students to integrate various disciplines towards the early diagnosis and potential elimination of diseases. While they take classes in broader areas of biology, chemistry, and engineering, BE-BME students specialize in medical diagnostics and devices. In the long-term, the BE-BME concentration will include classroom education, industry internships, and study abroad program to train and develop students with a global perspective on diseases. The ultimate aim of the BE-BME program is to equip graduates for their careers in medicine, pharmaceuticals, and medical devices. Through their unique education at MSU, we hope that the graduates would be able to effectively diagnose diseases (medicine), understand the function of reagents in diagnostic assays (pharmaceuticals), and contribute to the efficient design of diagnostic tools (medical devices). As professionals in these fields, they can impact society through the control and eradication of infectious diseases, improving quality of life, and saving lives. The future of BE-BME is positive as the medical-related industries are booming. Together with the BAR faculty, I look forward to moving this field in unique and exciting ways to a level that is world-class and world-renown consistent" with MSU’s goals and missions.

4. Outreach and Service

I am actively involved in outreach and service to the university and the community, I enjoyed my membership in the department, college, and university-level committees and review panels. I also enjoyed my time as a faculty in teaching short summer courses offered by the university.

I actively presented papers and organized sessions at the following professional meetings: Institute of Biological Engineering, ASABE, IEEE, American Chemical Society, and PITCON. I served as member of review panels for the National institutes of Health (NIH) and the National Science Foundation (NSF). Participation in these prestigious review panels indicates national recognition of the biosensors program at MSU. Because of my active involvement in review panels, NIH has granted me the privilege of continuous submission for 2010-2011. I also served as a reviewer for several journals.

Most of my community service is toward helping international students and families. They are a vulnerable group on campus due to their unique circumstances being
away from home, having to learn a language, adjust to a new culture, and live in a new environment. A small help always goes a long way in alleviating stress and homesickness.

The above summarizes my activities on mentoring, research, teaching, and service, I feel humbled by these accomplishments because I know that I could not have done these alone. It is all by God's grace! He is the ultimate source of wisdom, strength, and passion!

Vision

So where do I go from here? With God's gracious provision of wisdom and resources, I see the trajectory of my biosensor research as moving in two areas of application: biodefense and global health. My goal for the next phase of my career is to be the leader in developing biosensors for "personalized monitoring of infectious diseases" (PMID) in resource-limited settings, such as under field conditions and rural health clinics. The PMID concept will be used in the design, development, and validation protocols for evaluating performance measures. Of particular interest is the development of biosensors for personalized diagnosis of tuberculosis (TB) and its associated challenges: human immunodeficiency virus (HIV) co-infection and TB drug resistance. It is estimated that 1.8 million people die every year of TB, and it affects mostly the poor. It is my earnest desire to help reduce the deaths and emotional pain of losing a parent, a child, or a loved one from this disease. Thus, working to eliminate this disease in the world has become not only my research priority but my life-long mission. My vision is to make easily accessible diagnostics to the people in the comfort of their environment. Early diagnosis can lead to immediate treatment and interventions (while the patient is still in the clinic). I have already started to lay the groundwork for this long-term research, and am currently working with a scientist at the Centers for Disease Control and Prevention (CDC) in identifying early markers of TB infection before the organism shows up in saliva and phlegm. I am also working with colleagues from the Institute of International Health and the Center for Latin American and Caribbean Studies to set-up clinical trials of the TB biosensor in several villages in Mexico. Furthermore, I hope that my membership in the NIH review panels would provide me with tips on successful grant writing for NIH funding. In the broader sense, this biosensor platform can be adapted to detect other infections especially for neglected diseases in developing countries, and biodefense applications in field settings. These versatile platforms will allow me to strengthen my international presence with my collaborators around the world. Key initiatives will be immediately pursued with the Canadian Food Inspection Agency, the University of the Philippines Los Banos, and the University of Baghdad, Iraq.
As a complement to the BE-BME program, I would like to pursue the establishment of (1) an MS/MBA program in BE-BME, and (2) an interdisciplinary science-based PhD program on biosensors and rapid diagnostics. The rapid growth in medicine, biotechnology, pharmaceutical, and health care industries has created a demand for biomedical scientists with knowledge of business principles and practices. A science-based PhD program will allow non-engineering students to pursue the development of novel diagnostic technologies in various fields for the modern world we are in.

I recognize that my vision will not be accomplished by my might or by my power alone, but by God's grace according to His promise in Jeremiah 29: 11 which says: “For I know the plans I have for you,” declares the LORD, "plans to prosper you and not to harm you, plans to give you hope and a future," With God's promise and enabling, I look forward to an exciting and rewarding professional endeavor ahead.