

## Tenure Statement

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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 o<sup>1</sup>f life is to be interested in one thing profoundly and in a thousand things well." - Uoroce 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)<sup>1</sup>:

- 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. Boyer<sup>2</sup>, 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.

<sup>1</sup> Diamond R. li Adam, B (1993). *Recognizing faculty work: Reward systems for the year 2000*. Jossey-Bass, San Francisco, CA

<sup>2</sup> Boyer, E. L. (1997). Carnegie Foundation for the Advancement for Teaching.

### 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)<sup>3</sup>: (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).

<sup>3</sup> Covey, S. R. (1990). *The 7 Habits of Highly Effective People*. Free Press, New York, NY.

### **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:**

- Investigation of Construction Workers' and Managers' Attitudes Towards Project Planning Uncertainty. Plan A thesis.
- Assessment of Construction Worker Hazard Perception using Fuzzy Signal Detection Theory. Plan A thesis.

**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)<sup>4</sup>. 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 reflect 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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<sup>4</sup> Hanson, A. (1996) "The search for separate theories of adult learning: does anyone really need andragogy?" in Edwards, R., Hallson, A., and Raggatt, P. (eds.) *Boundaries of Adult Learning. Adult Learners, Education and Training* Vol. 1, London: Routledge.

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.