

**Narrative**

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## A. Introduction

I am currently an Associate Professor in the Department of Kinesiology, College of Health Sciences and Director of the Biomechanics Laboratory. I was promoted to Associate Professor without tenure in Fall 2001 at Ball State University, Muncie, IN. Following my promotion, I moved to Texas Woman's University (TWU) in January 2002. I have been at the current rank for six years with 5.5 years being at TWU. I was tenured in Fall 2006.

In 1988 I started my doctoral study at Penn State University, University Park, PA as a recipient of the Korean Government Scholarship for Overseas Study in the field of Exercise Science and Physical Education. After finishing my doctorate at Penn State in 1993, I returned to South Korea to work at the Korea Sport Science Institute as a Senior Researcher for four years. After being relieved from the scholarship obligations in 1997, I moved back to the United States and started my first academic appointment at Ball State University, Muncie, IN as a tenure-track Assistant Professor in the School of Physical Education. I was employed with Ball State for 4.5 years before moving to TWU.

I became 40 in 2002, the year I arrived at TWU. In oriental culture the age of 40 is often called '不惑' or 'not tempted', while the age of 50 is '知天命', 'understanding life's calling.' Therefore, I am in the process of learning the true meanings of my life through my everyday work as a professor at a higher education institution. These past six years (including the 5.5 years at TWU) has truly been a period of professional growth for me. It has been a journey of realizing my unique role as a scholar and my contributions to the areas of teaching, scholarship, and service. In this narrative I intend to first present my philosophies and beliefs in teaching, scholarship, and service. I will then try to define who I am as a scholar. Finally, I will put my professional achievements and accomplishments for last six years in perspective based on my values and the unique colors of mine.

## B. Teaching

My teaching philosophy can be best summarized as ‘聞一知十’ which translates to ‘hear one (thing) and understand ten (things).’ This expression is typically used for bright students who figure out ten by learning one. In other words, I try to teach students ‘one’ in such a way that they can utilize the newly acquired knowledge to understand ‘ten’ by themselves. For this reason, my teaching focuses more on ‘why’ than ‘what’ or ‘how’. I strongly believe that my role as a teacher is to lay a firm foundation for students on which they can build a variety of experiences and achievements in their future career. “Give a man a fish and you feed him for a day. Teach a man to fish and you feed him for a lifetime.”

My teaching philosophy in fact reflects the nature of my area of teaching and research. Kinesiology is an applied science composed of several distinct areas, such as adapted physical activity, biomechanics, exercise physiology, pedagogy, and sports management, and I teach biomechanics-related courses at both undergraduate and graduate level. Biomechanics can be defined as application of mechanical principles in the study of living organisms. Biomechanics uses tools of mechanics, a branch of physics involving analysis of the action of force and the resulting motion of the body, to study the anatomical and mobility aspects of living organisms, particularly the human body. By nature, biomechanics requires understanding of various mechanical concepts, principles, and laws, which in turn requires a sound math background. A hands-on or experiential approach in biomechanics may improve students learning to a certain extent but cannot replace the fundamental understanding of concepts and principles itself. This is why I emphasize more on the underlying principles and concepts than the phenomena in biomechanics.

### **Kinesiology Criteria for Teaching**

Required as a Minimum for Application:

1. Written statements by professional peers both inside and outside of the University which document his/her depth of understanding in the field of specialization as well as his/her ability to present material – excellence at this criterion level.

2. Course outlines, exams, reference lists, and other teaching materials that indicate excellence in teaching as judged by Peer Review Committee (PRC).

3. Student evaluations indicating excellence in the classroom and in student conferences. Student information used in evaluating teaching performance may come from the following sources: (a) University Student Evaluation Forms, (b) Instructor generated evaluation forms, and (c) unsolicited student letters.

Plus Any Combination of the Following with Quality and Quantity Judged by PRC:

4. College/university awards for teaching excellence
5. Excellence in advising students
6. Excellence in supervising
7. Shared decision making in course and curriculum development with leadership and mentoring of others
8. Chairing two or more thesis or professional papers and two or more dissertations

Since the written statements by professional peers will be solicited by the Department Chair (#1), this self-evaluation will focus on the last two required items (#2 and #3) and select additional items (#5, #6, #7, and #8) in the following sections.

### **Undergraduate Teaching**

My undergraduate teaching has been fairly consistent for last ten years. Like Ball State, TWU has only one undergraduate biomechanics course: KINS 3592 Kinesiology and Biomechanics. KINS 3592 is a two-hour course and lately I have taught one section in every semester with up to 30 students. A separate lab course (KINS 3591) is taught by a GTA. To teach biomechanics to Kinesiology undergraduate students is always a challenge since most Kinesiology students either have limited exposure to physics/mechanics or lack the necessary math background (trigonometry in particular). Since not all of our students are required to take physics and trigonometry as a part of their degree plan, basic trigonometry and vector algebra must be taught as a part of KINS 3592 before any mechanical concepts are introduced. The mechanical concepts and the equations that come with the concepts, and the math

problems that they have to deal with naturally make biomechanics an unfavorable subject in Kinesiology. The following excerpts from the Anonymous Student Response section of the Student Evaluation Forms (Spring 2007) certainly reflect students' perception and the inherent challenges:

- “I think we spent a good amount of time lecturing over the materials we needed to cover, however, I feel we should spend more time over the math portion (what we are tested over) in lecture.”
- “I'd like to see more of the math problems. I think you should go over the math more and not use the book so much because it's too much of a crutch. I would like to see more of your math questions and not the book.”
- “More review of math problems.”
- “I think it is really frustrating as an ‘all-level’ major the way the class is structured towards PT, AT, etc. because I do not need physics or trigonometry for my degree plan so I really struggled with interest and conceptual materials.”
- “I think the math portion should be covered in lecture as well as lab to get a better understanding of the material & so there is better preparation for the exam.”

My main teaching goal in KINS 3592 has been to make the class as a whole as interesting as possible while maintaining a high standard. Over the years, I have developed several instructional strategies to achieve this goal:

- Give tough unannounced pop-quizzes to force students to keep studying.
- Make the second and third exams semi-comprehensive (70% from the current segment and 30% from the previous segment) to force students to relate topics learned in different segments.
- Have students develop a research paper in groups to promote collaboration among the students. The topic is chosen strategically by the instructor so that students can obtain insights into biomechanics of human body in addition to what they learn through lectures.
- Show the big picture whenever possible, emphasizing inter-relationships among various

concepts and how they all fit together.

- Explain the key concepts thoroughly but succinctly by making them as easy as possible using simple models and analogies from daily living.
- Introduce strategic story breaks and read funny stories to have students refresh and refocus.
- Entertain students as much as possible to make the class as fun as possible within the given scope and structure.

Here are more excerpts from the student evaluations (Spring 2007) which somewhat reflect how these strategies are working:

- “The material was presented in a manner that made Biomechanics seem less intimidating. The instructor was very good in explaining the material.”
- “I think Dr. Kwon presented the material in an organized manner. I like how it was on a 70%-30% for the test questions.”
- “Kept course interesting. I would have preferred a faster pace, but the pace was appropriate for the students.”
- “You are one of the best professors I have ever had. As much as I did not like taking quizzes, they were extremely helpful in preparing for the test!”
- “I thoroughly enjoyed your class! This has been my favorite Kinesiology class and you are a great teacher!”
- “The instructor is the best I’ve had at TWU, primarily because he made the class fun, but I was also able to understand all the concepts.”
- “Dr. Kwon is a very smart person. I enjoyed his class in the end. The beginning of the semester was rough.”
- “I found that the instructor gave more than adequate examples for different topics. He broke the information down so that I could understand it.”
- “I enjoyed the stories very much!”
- “Notes & lectures were together well. That helped a lot and the reviews were also very

helpful.”

- “Very organized and I appreciate that a lot with so much to keep up with. I don’t have any suggestion for improvement. Dr. Kwon is an excellent professor.”
- “Dr. Kwon was a great teacher! He knew his information very well and taught in a manner that was easier to learn. He tried to make the course as fun as possible and the stories were very good! I really liked his teaching methods! Good job, Dr. Kwon!”
- “I thought Dr. Kwon explained the information thoroughly, and tried to help students as much as possible.”
- “Very good instruction. Clear, organized lectures with simple examples of complicated topics which helped me understand a lot more.”
- “Presented well. Instructor explained well and was approachable. I found all aspects of instructor’s presentation useful.”
- “The style of teaching was good and taking breaks and reading stories really helped refocus. Good class!”
- “The reviews were very helpful. More detailed instruction or subject for research paper.”
- “I really enjoyed this class. Dr. Kwon is great! He really explains things well, and makes us interested in Biomechanics. Thank you for a good semester!”
- “His demonstrations correlated with what we did in class as well as every day situations. I would definitely rate him as the best professor in the Kinesiology Department.”
- “I really enjoyed the instructor. He was different than I expected him to be. He has a great sense of humor. I love the stories!”
- “Dr. Kwon is an amazing professor. Everything was organized and explained well. I just couldn’t grasp the math, etc. and anything I missed was 50% my fault 50% required content I guess.”
- “I like how you outline and organize the class notes.”
- “Everything was fine. The paper was hard to research. Might need more help with that.”

I have tried to make the class interesting primarily for the students but I've come to the realization that I am also genuinely enjoying it. After ten years of college teaching, I am still discovering and experimenting on new aspects of undergraduate teaching.

The class homepage (<http://www.twu.edu/biom/3592>) provides course materials such as lecture notes, instructional computer programs, reviews, instructions for research paper, and formula sheet. The contents of the lecture notes have evolved over the years and I have organized them strategically to maintain students' attention to my explanation during the lecture. Instructional programs are provided for vector algebra and projectile motion to visualize various quantities.

### **Graduate Teaching**

My goal in graduate teaching is to produce quality scholars with strong research training. My motto in graduate teaching can be summarized as '青出於藍', meaning "Blue comes from the indigo plant but is bluer than the plant." I expect my students to make better scholars than me in the future with the foundation I currently present. Although this does not happen often, I have seen during my ten years of college teaching a few students truly excel in their areas of interest. This makes me quite proud. I constantly ask students to develop their own unique 'colors' through the graduate program at TWU as I did at Penn State almost 20 years ago.

Graduate teaching requires proper selection and effective delivery of course contents and knowledge with sufficient research experience but this was not the case when I joined TWU 5.5 years ago. Since my arrival at TWU the biomechanics graduate program has gone through major surgery. As I recollect, the main problem in the biomechanics graduate program at the time was that students were not getting in-depth training. There were problems in both selection and delivery of the course contents. Five to six doctoral students were working on their dissertation projects and I also inherited an equal number of active students. Regardless of their status, however, students were lacking in-depth understanding of the subject matter with poor preparation. Worst of all, there was no active on-going research program in the Biomechanics Laboratory at that time.

My main focus in terms of graduate teaching for last 5.5 years has been reshaping and revitalization of the biomechanics graduate program, the doctoral program in particular. I started the process by identifying three key remedy areas: (a) improvement of the quality of instructions in the graduate courses (raising the bar), (b) reshaping of the graduate biomechanics program (curricular changes), and (c) development of research projects and culture in the Biomechanics Laboratory (promotion of research). It turned out that raising the bar was the most problematic among the three since the majority of the inherited students were not adequately prepared to pursue the Ph D degree in biomechanics (Ph.D. in Kinesiology with Specialization in Biomechanics to be exact). Students could not handle course contents that doctoral students in biomechanics must. Even worse, they were not willing to change that, either. I lost most of the inherited students in the process. The situation has improved gradually through admission of new students with better qualifications and enforcement of the pre-requisites and competency courses (math, computer science, physics/mechanics, etc.) early on in the degree program.

The first round of reshaping of the doctoral program was completed in Spring 2005:

- Nine lecture-based courses were reduced to four (KINS 5513, 6523, 6623, and 6643).  
Obsolete courses were deleted and other courses were combined.
- A new repeatable research course (KINS 6813 Advanced Research in Kinesiology) was added. This was originally designed for biomechanics specialization only but later was adopted department-wide. Students get in-depth research experiences through this repeatable research class.
- Contemporary special topics courses (KINS 6903) were added as summer courses.
- Competency areas such as math, mechanics, and computer programming were enforced and implemented in students' course work.
- Course inventory adjustments were requested and the University Curriculum Committee approved new courses in Fall 2004.

In 2006, the course sequence was slightly modified to streamline delivery of the course contents.

Subsequent curricular change in the Master's program was completed in Spring 2007 based on the new courses.

The new doctoral program went through an external review in Fall 2005. Detailed descriptions of the new program were provided to three reviewers (Arizona State University, Indiana University, and University of Florida). The reviews were in general in favor of the new doctoral program. Here is a brief summary of the main criticism from the reviewers with my reactions in the parentheses:

- Sixty-six hours beyond the master's degree is a lot. (No action has been taken since this is a University requirement.)
- Six hours of dissertation is too few. (No action has been taken since this is a University requirement.)
- Taking organized research tools courses is not that efficient. (I whole-heartedly agreed on this but no action has been taken since this is a University requirement.)
- Students need more research experience. (Special topics courses may be replaced with KINS 6813 Advanced Research in Kinesiology for more research credit hours.)
- Cadaver-based gross human anatomy and neuromuscular control-related courses are recommended. (The gross anatomy course offered by PT Dallas and neuromuscular control-related courses offered by UNT may be included in the degree plan as electives.)
- Too many students for one faculty member. A second faculty member is needed. (I had six doctoral and three master students at the time this review was conducted. The total number of graduate students went up to twelve in 2006 but I currently have eight and it is still high for quality advising and training of the students.)

Lastly, a substantial amount of effort has been devoted to developing a strong research program in the Biomechanics Laboratory as the core aspect of the graduate study:

- Since Spring 2002, I have received four research grants (\$245,227 total) including one NIH-funded grant. In addition, two REP grants (one PI and one Co-I) were funded.
- Additional funds have been secured through service projects (direct check deposits to the

Biomechanics Lab account; over \$60,000 since Fall 2004).

- Several mini research projects have been developed.
- Several GRA positions have been maintained through grants and service projects.
- A strong research team has been established through recruitment of students with good qualifications and development of research culture in the Biomechanics Laboratory. All graduate students are actively participating in research projects regardless of their assistantship type and status (GTA and GRA). Most students are housed in the Biomechanics Laboratory.
- Undergraduate research interns (up to seven) have been recruited in the aim to provide undergraduate students with early exposure to research and to provide graduate students with additional help. Research interns are under the supervision of graduate students.
- The Biomechanics Scholarship has been established and a total of \$5,000 has been raised since 2004.
- Research collaborations have been established with PT Dallas and PT Houston and other institutions such as Ball State University, Baylor University, Edith-Cowan University, etc.
- Students have participated in conferences with financial support from the Lab funds.

I assess blending teaching and research in our new graduate biomechanics program has been fairly successful. The infrastructure has been established for last five some years and now we are shifting the focus to productivity.

### **Advising, Supervision, and Student Scholarship**

In achieving the fundamental goal of producing quality scholars with strong research training, I recognize multiple roles that I must assume for the graduate students: a role model, a motivator, and a facilitator. Student advising and supervision are the process to establish professor-student relationship within these roles. As a role model, I work hard to show students my commitment and responsibility in teaching and research. This I believe is evident in my scholarship records from past six years. To maintain quality and quantity in teaching and research is an important part of it.

My job as a motivator is to encourage students to set the goal high and thrive for it. I start this by setting a realistic but meaningful goal with each student. It is also essential to recognize student's strengths and weaknesses in this process. Comparison of the program requirements, my expectations, and individual student's strengths/weaknesses provides answers in regards to the areas students need to improve or can excel. I have included students in research projects and in the dissemination process. Seven peer-reviewed journal articles developed with students have been published or accepted for publication for last five and half years. Several manuscripts are under development at the moment with students. Over twenty papers have been presented (oral or poster) at prestigious national and international conferences by my team. We also have participated actively in the Annual Student Research and Creative Art Symposia, presenting 18 papers with two students (Sukhoon Yoon and Joong Hyun Ryu) selected as the Chancellor's Student Research Scholar.

As a facilitator, I have worked hard to build research infrastructure in the Biomechanics Lab and to develop research opportunities. Since Spring 2002, I have acquired over \$200,000 worth research equipment through the HEAF Funds and received over \$300,000 research funds through grants and service projects including one NIH-funded grant. I have provided financial supports for the students participating in prestigious international/national conferences (seven conferences since 2002).

One difficulty that I'd like to mention here is that biomechanics is essentially a stand-alone program with no specialization (such as motor control) or program (such as engineering) to share courses with. Graduate biomechanics courses are taken by students in the biomechanics specialization only with three exceptions for last five years: a dance student, a bioengineering student from UTA, and a kinesiology graduate student from Baylor University. Due to the research-oriented nature of the biomechanics program, it is extremely difficult to recruit graduate students without providing assistantships. Maintaining graduate biomechanics courses with my students alone puts me a heavy burden in terms of graduate student advising and training. I currently advise three masters and six doctoral students including one student who has finished his oral defense and is finalizing his dissertation. In addition, I currently have 27 undergraduate advisees.

Since 2001, I have chaired two doctoral dissertation committees plus one in progress with the oral defense done. I also served on three doctoral committees as a member. In addition, I have chaired two master's thesis committees and directed two professional papers. I lost most of the inherited students due to their lack of competency and inability to successfully continue graduate coursework in biomechanics. The students I admitted in 2002 and thereafter just started graduating this past summer. With the current number of active students enrolled in the program and the pace of progress, the number of quality theses and dissertations from the biomechanics program will increase rapidly in the near future. I admit that I am still at the beginning stage of directing theses/dissertations and this area has a lot of room to improve in the future.

### **Teaching Evaluation**

I used the student evaluations from KINS 3592 as the basis of my teaching evaluation. Among the 21 items in the Student Evaluation Form, I used only 16 items deemed relevant to KINS 3592 (Table 1). I computed the percentage of students who 'strongly' or 'moderately' agreed with each statement. For this, six items (2, 3, 6, 11, 13, and 16) were changed to affirmative language for consistency.

As shown in Table 1, the average scores from the period of Spring 2002 to Spring 2007 are 90% or higher in ten evaluation items out of 16. Five emboldened items (6, 11, 14, 17, and 19) are below 85%. I have tried to improve in these areas through adjustments of the teaching strategies and experimentation on new strategies and the data from the most recent evaluation (Spring 2007) look promising. Only one item fell below 85% in Spring 2007. The item that yielded least improvement was #17: "The instructor's method of presentation maintained my interest in class." I view this as an inherent limitation of KINS 3592. Although I introduce within the course the basic definitions of the trigonometric functions and teach how to use them in vector algebra with sufficient redundancy through a variety of examples and analogies, it is essentially impossible to make it interesting enough if the student does not even have basic arithmetic skills. Although students in general are in favor of my efforts to make the class fun, this trend won't improve substantially unless the nature of the class changes. One solution can be compromising of the contents but this is out of question since our current course contents conform to the guidelines published

by the National Association for Sport and Physical Education (NASPE). Considering the nature of KINS 3592 and the standard I maintain, I am quite pleased with my teaching performance.

**TABLE 1. Summary of the Student Teaching Evaluations (KINS 3592 Kines and Biomechanics)**

No	Question	Strongly or Moderately Agree	
		2002-2007 (N=133)	Spring 2007 (N=28)
1	The instructor explained the grading system early in the semester.	98%	100%
2	The instructor satisfactorily answered my questions.*	92%	96%
3	I have received feedback about my performance.*	92%	96%
4	The instructor presented an overview of content and objectives at the beginning of the course.	97%	100%
5	Tests or skills assessments were related to material covered in class.	98%	96%
6	The instructor related course content to my career or other courses.*	<b>80%</b>	86%
7	The instructor presented the material in an organized manner.	100%	100%
10	The instructor was enthusiastic about this course.	92%	100%
11	The instructor was easy to approach.*	<b>77%</b>	89%
13	Attending class was not a waste of time.*	90%	89%
14	The instructor assessed class progress by questioning, asking for demonstrations, etc.	<b>81%</b>	96%
15	Class assignments were related to the course objectives.	92%	100%
16	Critical thinking or analysis was required.*	98%	100%
17	The instructor's method of presentation maintained my interest in class.	<b>77%</b>	<b>81%</b>
18	I would rate the instructor as one of the best.	86%	96%
19	The instructor made clear applications of the subject matter to my major or to other course.	<b>82%</b>	93%

\*These questions were changed to affirmative language for consistency.

I was selected for inclusion in Who's Who Among America's Teachers 2006/2007 and was nominated as Favorite Faculty/Staff at the Senior Breakfast for last two years.

### Summary

My teaching for last six years can be best described as a lonely battle to revitalize the graduate biomechanics program and an on-going rediscovery of the undergraduate teaching. Being the only biomechanist, I had to reshape the graduate biomechanics programs, develop a strong research program in the Biomechanics Laboratory, and teach all graduate biomechanics courses by myself. Moreover, biomechanics specialization is essentially a stand-alone program with no related specialization or program to share courses with. Maintaining graduate courses with my students only puts a heavy burden on me in terms of student advising and training. As a result, my workload has increased substantially (Figure 1).

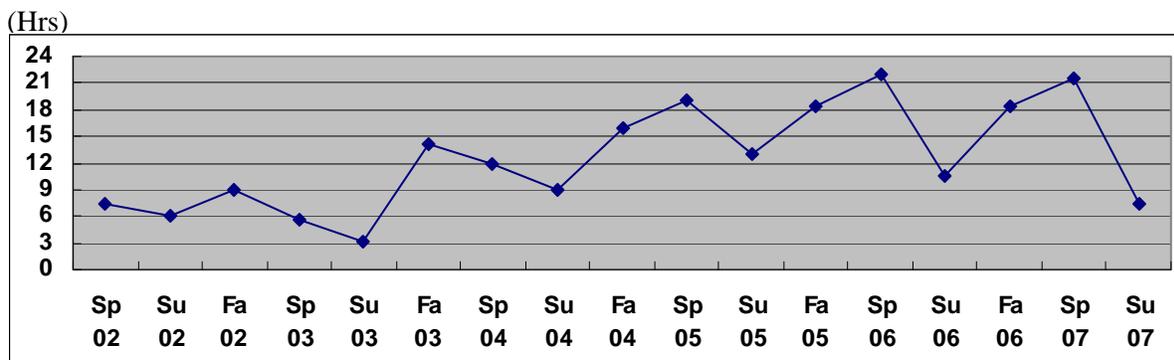


Figure 1. Workload History

Recently, I have experimented some new instructional strategies to make the undergraduate biomechanics class more interesting while maintaining the standard. Recent student evaluations (Spring 2007 in particular) suggest that these strategies are working. Best of all, I am genuinely enjoying it. I am implementing new strategies this semester and the outcome will be seen in the coming semesters.

In summary, I believe I have met the departmental teaching criteria of depth of understanding in the field of specialization, ability to present, and excellence in teaching. Although this promotion will be the last one, my efforts on developing new instructional strategies and experimentation, and curricular

development will continue since teaching is a constantly evolving process.

### **C. Scholarship and Creative Activities**

My philosophy of scholarship (research) can be best summarized by ‘學而時習之不亦說乎’ which translates to “Learning new knowledge and practicing it occasionally; isn’t it joyful?” Discovering new knowledge and applying it to discover even more knowledge gives me a lot of joy more than anything. This is the driving force behind all my hard work in research and scholarship. Mechanically speaking, human body is a highly redundant system with large number of degrees of freedom. Learning through research how the human body negotiates with the redundancies to produce the desired movement while complying with the physical laws is an enjoyable and joyful process. The four scholarship areas that I have concentrated on are:

- Generation of new knowledge through research to contribute to the advancement of knowledge in the profession
- Dissemination of the research findings
- Development of new research methods and tools
- Integration of research and teaching in graduate classes

Generation of new knowledge through experimental studies requires (a) identification of meaningful research questions within the interest area, (b) development of sound study designs, (c) collection and processing of data with quality control, and (d) analysis and interpretation of the outcome. I involve my students in every step of my research to provide them with in-depth research experiences. Through research students apply the knowledge they learned in the classroom, which in turn will generate more knowledge. Only through active participation in research, graduate students can make an independent researcher/scholar in biomechanics.

For last six years I have worked particularly hard on disseminating the knowledge and research findings through publications, presentations, and workshops. I have involved students in this process, too.

In addition, being a motion analysis specialist keen on new analysis methods, algorithms, protocols, and tools, I have developed several software programs for motion analysis in general, particular research projects, and undergraduate and graduate teaching. Programming is an important aspect of research in biomechanics since no single general-purpose software can meet various research needs and writing customized programs is often crucial. More importantly, the intellectual labor in programming carries educational values too since it enhances student's learning and understanding of the concepts substantially.

### **Research Interests**

I did my BS degree in 'astronomy' which by nature required a strong physics/mechanics background. In my senior year in college I registered for a course called 'biomechanics' offered by the Physical Education Department. Since, as a member of the college soccer club, I had a keen interest in application of my knowledge of mechanics to soccer training, the term biomechanics immediately attracted my attention. And it did not even take a week to reach the decision to pursue graduate degrees in biomechanics. It was so fascinating to analyze and understand human body motions in the mechanical perspective. One area of biomechanics that fit particularly well to my astronomy background was 'motion analysis' in which human body movements were analyzed and understood through quantification of the motion by means of high-speed filming with cameras. As astronomy major I was well versed in optics and optical systems such as telescopes and cameras and my knowledge of mechanics could be utilized fully in computing key kinematic and kinetic quantities of motion analysis. My passion for motion analysis has only grown since then and has been the driving force behind my research throughout my entire career.

I started my research career as a sport biomechanist, mainly interested in athletic performance. My doctoral dissertation project was a computer simulation of gymnastic airborne movement in which I took advantage of my knowledge of mechanics and computer programming skills. My work at the Korea Sport Science Institute (Korea Institute of Sport Science now) was to help Korean national athletes enhance their performances by biomechanical means. With my academic appointment at Ball State, however, my research focus has shifted to general human mobility biomechanics due to lack of funding in sport biomechanics. For this reason, in-depth analysis of human body motion (joint kinematics and

kinetics, and generalized movement patterns) in various physical activities (activities of daily living, basic motor skills, sports, dance, gait, etc.), and the effects of exercise intervention on joint motions and movement patterns have been the core aspect of my research lately. To be more specific, mechanics of elderly gait and fall prevention in the elderly by means of assistive devices such as walking poles has been the main research focus at the Biomechanics Lab. An NIH-funded 12-month intervention study was completed in 2005 with additional data collected throughout 2006-2007. A series of manuscripts are under development based on the data collected for last 2-3 years.

### **Kinesiology Criteria for Scholarly Activities**

Required as Minimum for Application:

1. Five or more presentations at professional meetings at state, national, or international level.

Quality judged by PRC.

2. Five or more publications in professional journals at state, national, or international level.

These must be research-based, theoretical, and/or philosophical and make a substantial contribution to the knowledge base. Quality judged by PRC.

3. Collegiality in mentoring and modeling scholarly activities with others, sharing ideas, and supporting each other.

Plus Any Combination of the Following with Quality and Quantity Judged by PRC:

4. Members of a national editorial board for a journal
5. Reviewer for scholarly publications
6. Publication of teaching materials
7. Submission of proposals for funding of scholarly activities and/or obtaining contract services with some proposals funded
8. Publication of abstracts and/or presentations
9. Publications of articles in non-refereed professional journals
10. Editing of book readings
11. Publication of book or monograph review

## 12. Establishing laboratories and/or designing of equipment/computer programs

This self-analysis will focus broadly on all scholarly activity items except #6, #10, and #11 in the following sections.

### **Grants**

For last 5.5 years at TWU, a fair amount effort has been devoted to obtaining external funding. I have received four external grants in a total of ~\$245,000 including one NIH-funded SBIR (Small Business Innovative Research) grant. Additional funds have been brought into the Lab through service projects (~ \$60,000) as well. With the external grants and additional funds, GRA positions have been created. As a result, the Biomechanics Lab has become one of the most active research laboratories in the department and on the campus.

At the request of Dr. Sanborn, Chair of the Department, a three-year (2007-2009) research plan has been developed early this year. The current research area is fall prevention in the mildly frail elderly by means of walking poles and long-term exercise effects of regular walking with poles in this population. An internal REP grant proposal was submitted as a part of the three-year plan in the spring and was funded (\$6,000). External funding will be sought after completion of the internal grant project.

### **Software Development**

Given my strong passion for motion analysis, one area that I have worked diligently is software development. My programming career dates back to 1985 when I was working on my master's thesis at Seoul National University. Initially, I started developing computer programs for my own use since I could not find any for my thesis. Over the years, I have developed two main large-scale software packages: Kwon3D and KwonGRF. Kwon3D is a comprehensive 3-dimensional motion analysis software package which I originally introduced in 1991 (version 1.0) as a student at Penn State. I finished version 3.0, the first Windows-compatible version, in 2001. KwonGRF is a software package specialized for ground reaction force (the force acting on the human body from the ground) analysis. The Windows version (2.0) was finished in 2002. In 2006, after a series of revisions, these two packages were combined into a new-generation software called 'Kwon3D XP.' Kwon3D XP consists of approximately **270 program modules**

with approximately **180,000 lines of codes** more than half of which are written by me. Kwon3D, KwonGRF, and Kwon3D XP are the fruits of my tireless quest for the joy of developing comprehensive, powerful, and flexible software packages for motion analysis and related areas.

A website has also been developed in relation to these packages: Kwon3D Motion Analysis Web - Theoretical Foundation (<http://kwon3d.com/theories.html>). Through this site I made all algorithms and theories used in Kwon3D and KwonGRF available to the scientific community. This site has been recognized as a valuable internet resource by professional societies, such as International Society of Biomechanics (<http://isbweb.org/software/movanal.html>), and by companies, such as Ariel Dynamics and Motion Analysis, and has been used in the classes at several universities. It was also cited in textbooks including “Zatsiorsky, V.M. (2002). Kinetics of Human Motion. Champaign, IL: Human Kinetics.”

Another area that I have concentrated on as an expert in motion analysis is motion analysis workshops. I have run ten international motion analysis workshops for last six years. The countries include Brazil (XXV International Symposium on Biomechanics in Sports), Taiwan (XXI Congress of ISB; Taiwan Normal University), Korea (Sungkyunkwan University; Chosun University; Korean Society of Sport Biomechanics; Suncheonhyang University), China (Dalian University of Technology), Greece (Aristotle University of Thessaloniki), and Spain (Universidad de Extremadura). Through the workshops, I have taught not only the theories and practices of motion analysis but also its mechanical basis.

### **Publications and Presentations**

Since 2001, 17 articles have been published or accepted for publication in peer-reviewed journals. Among these, American Journal of Sports Medicine (Sage Publications) and International Journal of Sports Medicine (Georg Thieme Verlag) are highly prestigious journals included in Thomson Scientific's Science Citation Index®. Journal of Sports Sciences (Taylor & Francis), Journal of Applied Biomechanics (formerly International Journal of Sport Biomechanics; Human Kinetics), Sports Biomechanics (Taylor & Francis), Research Quarterly for Exercise and Sport (Amer Alliance Health Phys Educ Rec & Dance), Journal of Strength and Conditioning Research (Allen Press) are highly prestigious refereed journals covered by Science Citation Index Expanded™. Journal of Dance Medicine and Science

(J Michael Ryan Publishing) is a highly prestigious refereed journal in the area of dance science. Korean Journal of Sport Science (Korea Institute of Sport Science) is the only sport science-related journal published in English in Korea. It is also one of the most rigorously reviewed journals in Korea.

International Journal of Applied Sport Science is the successor of Korean Journal of Sport Science and evolved into an international journal. I have been particularly successful in past two years (2006-2007) with twelve articles either published or accepted for publication during this period. One book and two book chapters also have been published or currently in print.

Seven non-refereed articles have been published since 2001. The 'Sport Science Magazine' is published in Korean by Korea Institute of Sport Science, Seoul, Korea. This magazine is distributed to national sports governing bodies, Korean Olympic Committee, national training centers, government offices (Ministry of Culture and Sports), schools, universities, research laboratories, and individual subscribers. My articles have covered a variety of issues, ranging from sport biomechanics to computer and technology in sport science. 'The Science & Technology' is published by the Korean Federation of Science and Technology Societies, Seoul, Korea.

I have had approximately 29 invited and refereed oral presentations (as the presenting author or a co-author) since 2001, mostly in prestigious national/international conferences such as the Congress of International Society of Biomechanics, International Symposium on Biomechanics in Sports, and Annual Meetings of American Society of Biomechanics. In addition, twelve refereed poster presentations have been made with my students. A total of 18 podium/poster presentations have been given by the biomechanics team at the TWU Annual Student Research and Creative Art Symposia since 2004.

### **Research Collaboration**

Within the Department, I have collaborated with Drs. Biggerstaff and Nichols on the NIH-funded walking pole study, with Dr. Silliman-French on a muscle training study for children with Down syndrome, and with Dr. Ben-Ezra on the ballast study. I also provided equipment (Balance Master®) support to Drs. Lisa Silliman-French and Ron French for their study with visually impaired children. I am currently working with Dr. Ron Davis to develop a series of research projects using the vibration plate.

Outside the Department, research collaborations have been established with PT Dallas (Drs. Suh-Jen Lin and Elaine Jackson) and PT Houston (Dr. Sharon Olson). Dr. Lin received an internal (REP) grant (the amputee study) in 2003 and the data collection was conducted at the Biomechanics Laboratory under my supervision. The data collection for Dr. Jackson's ACL study with soccer players was also conducted at the Biomechanics Laboratory in 2004. Dr. Olson provided her Balance Master® system for our NIH-funded walking pole study for over a year. We have provided Dr. Olson motion analysis software and camera calibration frame for her research. Two papers have been published through collaboration with Dr. Olson's group.

Research Collaboration has been developed with other institutions as well, such as Ball State University, Muncie, IN (Dr. Eric Dugan), Baylor University, Waco, TX (Dr. Joe Shim), Edith-Cowan University, Perth, Australia (Dr. Rob Newton), and Seoul National University, Seoul, Korea (Dr. Bee-Oh Lim). The NIH-funded walking pole study was conducted at both TWU and Ball State simultaneously. Several papers have been published in peer-reviewed journals through research collaboration with other institutions.

### **Editorial Board/Reviewer**

For last six years, I have served as reviewer for 14 scientific journals including highly prestigious refereed journals such as Journal of Applied Biomechanics, Research Quarterly for Exercise and Sports, Journal of Biomechanics, Clinical Biomechanics, Sports Biomechanics, Journal of Sports Sciences, Medicine and Science in Sports and Exercise, Archives of Physical Medicine & Rehabilitation, IEEE Transaction on Biomedical Engineering. During the same period, I have been on the editorial boards of four journals related to sport science/biomechanics: Sports Biomechanics, International Journal of Applied Sport Science, Korean Journal of Sport Science, and Journal of Sport Science (published in Korean).

This year I was selected as the new Editor of Sports Biomechanics. I am currently serving as a Co-Editor and will take over the task completely in 2008. I was on the Executive Editorial Board of the journal for four years (2003-2007) prior to this appointment. Sports Biomechanics is a relatively young

international journal in its 6th year of circulation. It is now covered by Thomson Scientific Journal Citation Report® and Science Citation Index Expanded™ and listed in major databases such as Medline and SPORTDiscus. Sports Biomechanics is now perceived as one of the top-ten biomechanics serials in the area of exercise and sport sciences by biomechanists in North America (Kundson, D., & Chow, J. 2007. North American perception of the prestige of biomechanics serials, *Gait & Posture*, 26, E-published ahead of print). Editing an international scientific journal is a huge task to undertake and it was a great honor for me to be selected as the editor by professional peers. I am currently in the process of setting up the online manuscript submission system.

### **Summary**

I believe I have met the departmental scholarship criteria of presentations, publications, collegiality in sharing ideas and supporting each other, editorial board/reviewer, and grants. With the promotion, I will maintain the momentum of research in motion analysis of human body motions and develop major grants in the area of fall prevention in the frail elderly by means of walking poles.

### **D. Service**

The last six years have been the process of discovering the true meanings of my life: ‘不參於天地用人之時 何可曰人生乎’ or “If you don’t commit when heaven and earth need you, how can it be called a life?” Basically, discovering the true meanings of life is to answer the life’s calling with enthusiasm and commitment. So what is my life’s calling then? I have identified areas of commitment based on my interests, strengths, and weaknesses:

- Institution: Biomechanics Laboratory, graduate biomechanics specialization, Kinesiology graduate programs, research, and technology
- Profession: professional organization, scientific community, and the art of motion analysis
- Community: ethnic and religious groups

What is important to me in the process of identifying the areas of commitment was ‘知彼知己’ or

'knowing one's opponent and oneself,' which can be appropriated in this case to "To maximize the outcome, it is important to understand the nature of the service and your strengths/weaknesses."

### **Kinesiology Criteria for Service**

Required as Minimum for Application:

1. Leadership and mentoring in departmental, college, and university functions
2. Membership in local, state, national, and/or international professional organizations and

attendance at some meetings

3. Active contributing member of departmental committees with leadership and mentoring

Plus Any Combination of the Following with Quality and Quantity Judged by PRC:

4. Department and college administrative work with some university administrative work
5. Chair of departmental/university committees
6. Mentoring and supervision of graduate teaching assistants
7. Involving students in activities outside of class that contribute to their personal and

professional growth

8. Invited lectures outside University
9. Member or chair of a school or program evaluation team
10. Public service participation and/or publicity (radio talks, television appearances, etc.)
11. Promotion of alumni relations
12. Consultants to local, national, and international organizations
13. Documentation of efforts to recruit
14. Service awards and citations

This self-analysis will focus on all required items (#1, #2, and #3) and select additional items (#4, #5, #6, #7, #8, and #13) in the following sections. Although Kinesiology criteria do not include service to profession, I will expand all items to service to profession. Item #8 is included in Scholarship and Creative Activities.

### **Director of the Biomechanics Lab**

The graduate biomechanics program and the Biomechanics Laboratory have been my primary subjects of institutional service all along. Development of a strong research program and establishment of the necessary infrastructure have been the main focus:

- Development of research culture in the Biomechanics Lab through various initiatives such as weekly Lab meetings
- Development and direction of research projects
- Development of research collaborations with colleagues within the department, other programs within the University, and other institutions and companies
- Designing, setting, installation, repair, and trouble-shooting of research hardware/software
- Lab renovation and reconfiguration of the equipment
- Fund-raising for the Biomechanics Scholarship
- Lab accounting
- Acquisition of capital equipment through the HEAF Fund
- Financial supports for students attending conferences
- Advertisement of our graduate program and recruitment of students: ISBS Symposia, ASB website, ISBS Newsletters, etc.
- Mentoring for graduate TAs teaching biomechanics-related courses: Sukhoon Yoon, Gary Christopher, Jeff Casebolt, Chris Lambert, and Kunal Singhal
- Supervision of teaching internships of the doctoral students: Chris Lambert and Kunal Singhal
- Promotion of student scholarship

### **Institutional Service**

The graduate program, particularly the doctoral program, has been the main focus of my service at the departmental level. I noticed several problematic areas in our doctoral program as early as my first visit to TWU for interview. Since my arrival at TWU I have been an active member of the Graduate

Program Committee of the Department through which I proposed several key changes. With minor modifications in some cases, most of my proposals have been approved by the faculty: (a) inclusion of the research tool hours in the 96-hour degree requirement, (b) revision of the doctoral core courses, (c) introduction of the 1-hr research seminar course (KINS 6811), (d) reduction of the doctoral advisory committee membership to three, (e) introduction of the advanced research course (KINS 6813), (f) possibility of using an alternative dissertation format with individual research committee's approval, etc. In addition to the Graduate Program Committee, I served on Scholarship Committee, Graduate Admission Committee, and Institutional Effectiveness Committees. I have participated in regular faculty duties such as student orientation, portfolio evaluation, and undergraduate advising.

The second area of service that I have worked on consistently since my arrival at TWU is maintenance of the Department website (<http://www.twu.edu/hs/kines>). My working knowledge of HTML publishing and prior experiences of homepage development and maintenance allowed me to undertake this role. I completely revised the department website twice, once in 2002 when I initially took over the webspinner role and once in 2004 when the University changed the homepage structures completely. With my efforts, Kinesiology Department has always been a forerunner in developing and maintaining the department website following new University guidelines. I also revised the Project INSPIRE website (<http://www.twu.edu/inspire>) once in 2005 for Dr. Carol Huettig. The Biomechanics Laboratory website (<http://www.twu.edu/biom>) was originally designed by me and is currently maintained by graduate students.

I am well versed in computer technology and this has been a unique strength of mine. I have maintained my professional portfolio (CV) in digital format since 2004. With the help from my students I have run spreadsheet (Microsoft Excel) workshops for the Kinesiology students. I am currently helping Dr. Terry Senne to produce pre-requisite diagrams for undergraduate advising. We are also revising the undergraduate program pages.

At the College level, I served as a member of the CHS Research Committee and Research Council from 2003 to 2005. I was the webspinner of the CHS Research website from 2004 to 2006. I was

nominated by Drs. Sanborn and Ishee in 2006 as the CHS representative for promotion and tenure criteria and attended a working lunch to present information for the emerging criteria, learn from each other, and discuss the Boyer model.

At the University level, I served on three committees at TWU: Research Support Committee (2002-2004), Technology Committee (2004-2005), and Student Travel Committee (2004-2006, 2007-present). Taking advantage of my strength in technology, I am currently helping the chair of the Student Travel Committee on streamlining the evaluation process of the student travel applications. An Excel spreadsheet with formulas embedded has been created for this.

I just started my three-year term on the Graduate Council and its Membership Committee and Research Committee. As a member of the Membership Committee, I have evaluated Graduate Faculty Membership applications. Since graduate education and research are my main interest areas within the institution, I look forward to making positive contributions to the Council and ultimately to the University. Another line of service that I started this year is the Student Marshal at the commencement. I genuinely enjoyed serving as a Student Marshal last spring and intend to continue this role. I also have participated in University functions such as Open House and Pick-a-Major Fair as a departmental representative. I have been a graduate faculty since my arrival at TWU in 2002.

### **Service to Profession**

I have been an active member of three biomechanics-related international/national societies: International Society of Biomechanics (ISB; since 1993), International Society of Biomechanics in Sports (ISBS; since 1997), and Korean Society of Sport Biomechanics (since 1993). For last six years, I have attended approximately 25 international/national conferences or professional meetings including those hosted by the aforementioned societies.

I served as the Vice President of Publications of ISBS for five years since 2002 until this summer. I was elected to this post for three consecutive terms but had to resign this summer due to my new appointment as the Editor of Sports Biomechanics. During the five-year period I oversaw all publication-related operations of the Society: being ISBS' liaison officer for Sports Biomechanics, chairing the

Publications and Editorial Committees, publishing the ISBS newsletters, managing the ISBS website, etc. I also chaired an editor search committee in 2003. During my tenure as VP, I have become a facilitator for the Society. I have been appreciated by peers for my facilitator role in the business meetings of the Society and in developing strategic plans.

In addition, I have served on nine conference committees/boards for last six years: International Symposia on Biomechanics in Sports hosted by ISBS and the International Conferences on Biomechanics hosted by IASTED (International Association for Science and Technology for Development). I chaired conference sessions in seven international conferences including four ISBS Symposia, one ISB Congress, and one International Symposium for Adapted Physical Activity. I have delivered approximately nine invited presentations since summer 2001 at various international conferences and motion analysis workshops. I had served as the moderator of the 'Sports science' Internet Discussion Forum (~2,000 subscribers) until 2004.

One particular achievement that I am proud of as a motion analysis expert is the development of Kwon3D-series software packages and the Kwon3D Motion Analysis Web - Theoretical Foundation (<http://kwon3d.com/theories.html>). I also have run a series of international motion analysis workshops to disseminate new and advanced motion analysis theories and techniques. See the Scholarship section for details.

### **Service to Community**

My service to the community has concentrated on the ethnic and religious groups. Since 2004, I have been on the Parish Council of the Korean Martyrs Catholic Church, Hurst, TX while serving as the Director of Liturgy of the Parish. In this capacity, I supervise all liturgy-related tasks of the Parish. Liturgy is one of the most important and complex aspects of the Catholic Church and the being the Director demands commitment, consistency, reliability, and mastery.

Another religious group that I've got involved deeply is the Korean-American Catholic Cursillo – Region of Mid-South. I have served initially as the Director of Music (2004-2005) and later as the Vice Executive Secretary (2005-present), overseeing educational operations of the organization such as

member training and weekend retreats. I also served as the Chair of the Cursillo of Christian Life 2006, Korean-American Catholic Cursillo – Region of Mid-South, held in Dallas, TX in 2006. I have given lectures to the volunteer groups of the Cursillo of Christian Life for three years.

I also have served for non-religious groups or events such as the 12<sup>th</sup> Korean-American Olympic Festival 2003 held in Dallas, TX in 2003. I served as the Person in Charge, Volunteer Operations and Planning. Recruitment and assignment of the volunteers to various venues and arrangement of the transportations for the delegations (~1,200 participants) were the main task of the team under my direction.

### **Summary**

I believe I have met the departmental service criteria of leadership in University functions, membership in professional organizations and attendance at professional meetings, active participation and contribution to institutional committees, administrative work for the Biomechanics Lab and the department, invited lectures at international professional meetings, and mentoring and supervision of graduate teaching assistants and teaching interns.

## **E. Collegiality**

Kinesiology criteria for collegiality are

1. Works cooperatively with faculty at departmental meetings and university committees
2. Provides professional support to faculty members as they attempt to carry out their work and develop themselves professionally
3. Works cooperatively with other faculty and staff
4. Works cooperatively with students

This self-evaluation will focus on all required items. In regards to item #4, see the Advising, Supervision, Student Scholarship section in Teaching for details.

To me collegiality has multiple meanings:

- Collegiality means accommodation. For example, I worked with Dr. Kyle Biggerstaff on the NIH-funded walking pole study. I willingly modified the original research design of the study to accommodate Dr. Biggerstaff's proposal of longitudinal blood tests throughout the 12-month intervention period. Both teams worked together to coordinate the data collections. Similar accommodation will be made with Dr. Nancy DiMarco in our upcoming REP study on fall prevention in the frail elderly.
- Collegiality means working together. I worked with Dr. Vic Ben-Ezra on a study involving ballasts in which both groups got together and developed a multi-faceted project combining biomechanics and exercise physiology. I also worked with Dr. Nichols on the walking pole study. He brought in his expertise of bone mineral density.
- Collegiality means helping. I worked with Dr. Silliman-French on a muscle training study for children with Down syndrome. This study was conducted by a post-doc, Dr. Bee-Oh Lim, and Dr. Silliman-French's help was instrumental from the proposal stage to the execution. Later, her group (adapted physical activity specialization) developed a balance study involving visually impaired children and I supported the study by offering our BalanceMaster® system for data collection. It required transportation of the equipment to an off-campus site and both teams worked together to arrange the transportation of the equipment. Similar collaborations have been established with PT Dallas (Drs. Suh-Jen Lin and Elain Jackson) and PT Houston (Dr. Sharon Olson). I have offered our Motion Analysis Lab for Drs. Lin and Jackson's data collections. Analysis of the collected trials was conducted by my team. Dr. Olson graciously provided her BalanceMaster® system for our NIH-funded walking pole study for over a year. (Later we acquired a unit by ourselves.) In the mean time, we provided Dr. Olson's team with motion analysis software (Kwon3D) and necessary instructions and supports. One of our camera calibration frames was loaned to PT Houston as well. Two papers have been published through collaboration with Dr. Olson's

group.

- Collegiality means sharing. I am currently working with Dr. Ron Davis to develop a new line of research using the so-called vibration plate. We will share the Motion Analysis Lab (PH 124) and the equipment and collaborate on data collection and subject training. We are currently developing an REP proposal together.
- Collegiality means blending of different colors. I had an opportunity to team teach a Research Seminar (KINS 6811) with Dr. Ron French in the summer of 2007. Dr. French's pedagogy background and my science (biomechanics) background blended together well and we all (both of us and the students) had an enjoyable teaching-learning experience. Another good example of blending is the work with Dr. Margaret Wilson, a former doctoral student in the Dance Department. She joined my team bringing unique research questions from her dance background. By blending the art of dance and biomechanics we have published three journal articles and the fourth is in review at the moment. Collegiality is equally important in working with students.
- Collegiality means constructive suggestions. I am currently serving on the Student Travel Committee and during the September meeting I made a suggestion to modify the review process. I believe my plan can simplify the review process and automate scoring substantially. For this, I created an Excel spreadsheet with all necessary formulas embedded. I look forward to seeing how my suggestion will be taken.

In summary, I believe I have met the department collegiality criteria of working cooperatively with faculty at meetings, providing professional support, working cooperatively with other faculty, staff, and students.