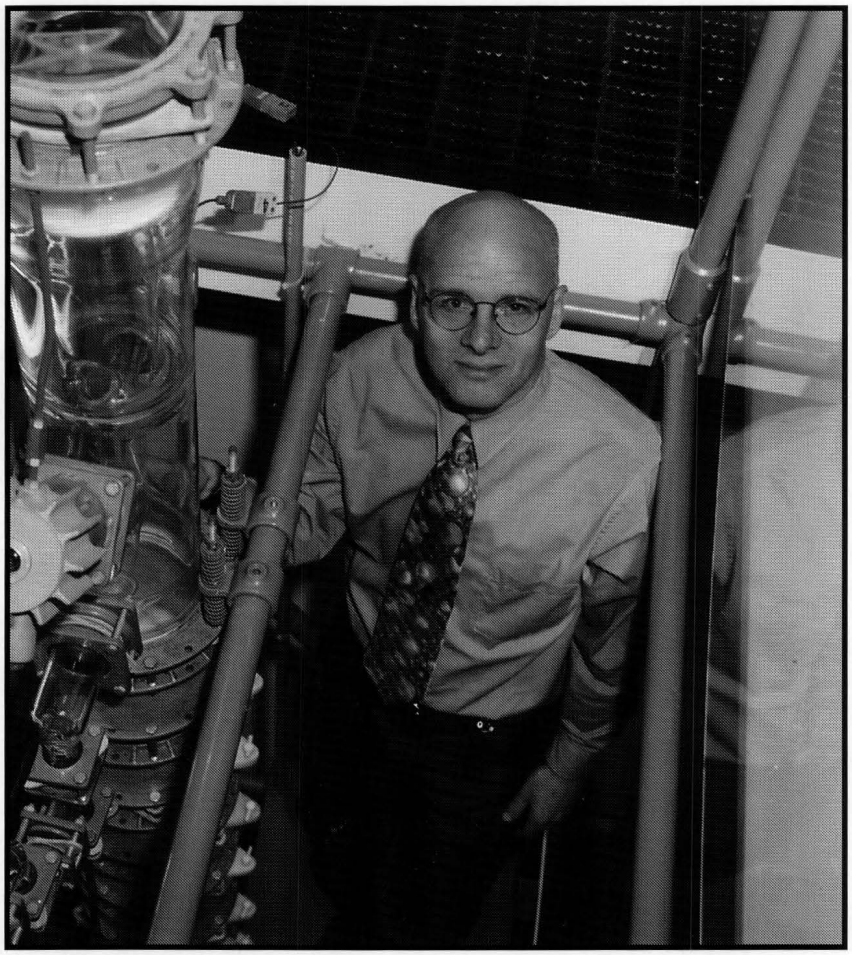
Steve LeBlanc

of the University of Toledo



G. Glenn Lipscomb
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Toledo, Ohio

Close your eyes and envision Johnny Carson. As Carnac, he is wearing a turban and holding an envelope to his forehead. Johnny's face contorts as he struggles to divine the answers to a question written on a slip of paper hiding inside. "What are...a diploma, the signature of Linda Furney, a photo of Bruce Lee, and a comb?"

Johnny holds the envelope between the thumb and forefinger of his left hand, rips off the end, blows gently into it, and extracts the paper. "The question is: Name three things in Steve LeBlanc's office and one that is not." Steve's office obviously contains much more, but these items tell a lot about his contributions to the chemical engineering community and his life outside it.

A Diploma

Steve was born and raised in Toledo, Ohio. His mother Nellaine, a Toledo native, worked as a sales representative while his father Martin, a San Francisco native, was a shoe repairman. The two first met at a shoe repair store where they were employed. Both were high school graduates, but neither had gone to college. Steve has one sibling, his sister, Sandra Meinzer, also of Toledo.

After graduating second in his class from high school, Steve's parents encouraged him to further his education. Based on his academic performance, an essay, and an interview, Steve was awarded the Stephen K. Mahon Scholarship from Toledo Edison to support study at the University of Toledo. This prestigious award covered tuition, books, supplies, and even parking expenses. What caught the interviewer's attention about Steve? His grades? His essay? Nope. The interviewer was most interested in why he read *Reader's Digest*! Steve was an avid reader in high school, but the interviewer thought it was unusual that a teenager would enjoy *Reader's Digest* (obviously a favorite read of the interviewer).

Steve enrolled in the chemical engineering program at Toledo. He was attracted to chemical engineering because of his high school chemistry teacher, Raymond Squire. Raymond was a University of Toledo chemical engineering graduate, the first recipient of the Toledo AIChE Section Outstanding Graduate Award in 1957, and it was his inspiration and encouragement that sent Steve down his career path.

Steve took two classes from Raymond: general chemistry

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and advanced placement chemistry. In general chemistry, Steve was introduced to technical problem solving. He was particularly impressed by Raymond's problem-solving skills, organization, and attention to detail. Steve also appreciated the time Raymond took to talk with students about chemistry and life. These are the same attributes that students commend Steve for today.

The Stephen K. Mahon Scholarship afforded Steve an opportunity to work part-time during the academic year and full-time during the summer at Toledo Edison. When initially approached about working, Steve turned down the offer—he already had a job working at McDonald's. What Steve didn't realize was that McDonald's was paying minimum wage, $1.65/hour, while Toledo Edison paid $3.75/hr.

Steve soon learned that working for Toledo Edison was more profitable, but he doesn't regret having passed on the opportunity that first year. He met his wife-to-be, Molly McKelvey, while working at McDonald's. Because of his interest in Molly, Steve continued to work part-time for McDonald's during the summer months after his day shift with Toledo Edison had ended.

Steve's job at Toledo Edison was first in Mechanical Engineering, then in Power Engineering, the department involved with the design and construction of the Davis-Besse Nuclear Power Plant. He helped document design revisions and maintain construction records. The income helped instill an appetite for the latest electronic gadgets. He spent most of his first paycheck on his first calculator—a whopping $150! Steve had selected his first college physics lab partner based on the fact that the guy was smart *and* had a calculator. Now, all he had to look for was smarts.

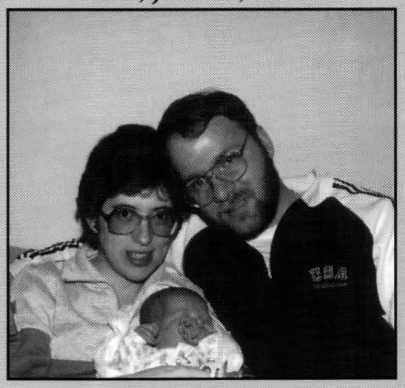
Steve was a bright student. His academic excellence led to receipt of the Perry's Outstanding Sophomore Award and the EIT Award (for the highest grade on the Engineer-in-Training Examination). His class also excelled—three of the nine graduates went on to receive Doctoral degrees.

After receiving his Bachelor's degree in June of 1976, Steve married Molly and headed to the University of Michigan to pursue a Doctorate. He completed the requirements for a Master's, passed the Doctoral-qualifying exam, and had started on his research when he decided to forgo completing the degree requirements—Molly was pregnant with their first child, Charlie, and had quit her job as a fifth-grade teacher. Also, his father was seriously ill with cancer. Steve decided to return to Toledo Edison as a full-time engineer, where he continued to work on the design and construction of Davis-Besse in the Power Engineering Department.

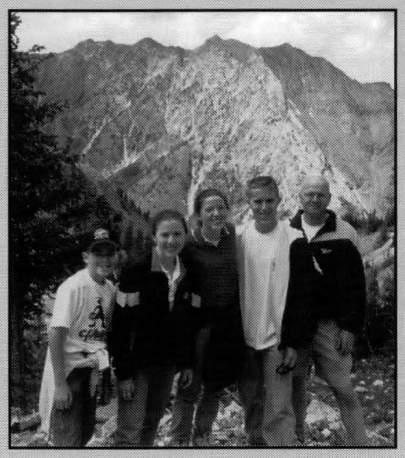
Steve worked at Toledo Edison for three years as one of the three chemical engineers they employed. He also remained active in the local AIChE section. Through AIChE, he kept close contact with the faculty at Toledo and was given an opportunity to change his career path when Joseph Boston left the Toledo faculty. Shortly thereafter, Les Lahti, the Department Chair, asked Steve to take Joe's position.

The decision to become an academic was not easy: Steve and Molly now had two children (Susie was born in 1979), and he would have to complete his Doctoral degree requirements while simultaneously teaching a full load. But Steve had tired of the routine work he was doing and was sorry he hadn't finished his degree, so he took the faculty position. As his current colleagues can attest to, Steve's

Steve and Molly tie the marital knot, June 25, 1976.



Charlie arrives, and . . .



. . . before you can say thermodynamics, here's Joe, Susie, Emily, and Charlie (with Steve at Snowbird), all grown up!

willingness to take on such a formidable workload is characteristic of his personality and commitment.

Steve worked with Scott Fogler studying solid dissolution by acidization. Scott had developed an interest in the acidization of sandstone oil reservoirs. Acidization opens pores in the formation and thereby enhances oil recovery. A mixture of hydrofluoric and hydrochloric acids does the job, but either acid by itself does not—and this synergistic effect, the catalysis of HF dissolution by HCl, intrigued Scott.

Steve's project was to look at the dissolution of other materials, in particular manganese oxides. He was to determine if dissolution is catalyzed, what controls the rate of dissolution, and if any other physical processes were involved.

He found that upon dissolution, manganese oxides form two types of structures: 1) a Swiss-cheese structure in which a number of holes would appear and grow in diameter and depth until they coalesced, and 2) a peeling orange structure in which the holes would preferentially grow laterally with little change in depth. The latter is not desirable in electronic materials where one desires to etch sharp rectangular channels on silicon wafers. A better understanding of the physics of manganese oxide dissolution might lead to improved manufacturing processes in the microelectronics industry.

Steve also studied the dissolution of a polydisperse collection of particles. He used population-balance methods to model the evolution of the particle size distribution with time. Steve demonstrated that use of the mean particle size severely underestimates dissolution time relative to predictions that account for the complete distribution. The deviations were greater if dissolution was mass-transfer limited rather than reaction-rate limited. This was due in part to a broadening of the size distribution that occurred under mass transfer-limited conditions.

When asked what were the most significant outcomes of his Doctoral research, Steve gives personal and technical answers. Personally, the non-technical education Scott provided was most significant: "Scott was a good teacher—he taught you how to think and ask questions." Technically, Steve says the fundamental framework developed to analyze powder dissolution, dissolved structure morphology, and the effect of defects was most significant.

From 1980 until 1985, Steve worked three jobs: 1) graduate student, 2) instructor, and 3) husband and father. Most of us had our hands full with graduate school, but Steve simultaneously taught two classes each quarter. During this time, Molly and Steve also welcomed two additional family members: Emily in 1982 and Joe in 1985. Clearly, Steve had developed excellent time-management skills.

By the way, how do you measure how long it takes to get a PhD? Steve's unit of measurement is miles. He put 65,000 miles on his Toyota Tercel commuting between Toledo and Ann Arbor to complete his degree.

Upon receipt of his diploma, Steve became an Assistant Professor and started his progression up the academic ladder. He didn't dawdle along the way. He became an Associate Professor in five years, and four years later he reached the pinnacle of academic success—Professor. In the fall of 1993, he started his progression through the administrative ranks when he became Interim Department Chair. "Interim" was dropped from the title in 1995 and he has served as Chair continuously since then.

The Department has flourished under Steve's leadership, despite numerous challenges. The Engineering College moved to a new building in the fall of 1995 and Steve was responsible for overseeing all aspects of the Department's move, from faculty office assignments to disassembly and reassembly of the unit operations laboratory, including a two-story glass batch distillation column.

After the move the Department lost three faculty members. Steve helped fill the void left behind by serving as Department Chair, Undergraduate Studies Director, and Graduate Studies Director for almost a year. As he had done earlier in his career, Steve also taught two classes each term.

Steve staged a four-year-long recruitment campaign to replace the lost faculty. His efforts were rewarded by the hiring of seven faculty members (Martin Abraham, Maria Coleman, John Dismukes, Isabel Escobar, Dong-Shik Kim, Arun Nadarajah, and Connie Schall) who have become the research and teaching core of the Department. In addition to the move and faculty hiring, Steve oversaw conversion of the academic calendar from quarters to semesters, incorporation of mandatory co-op in the curriculum, and ABET 2000 accreditation. Any one of these items represents a tremendous amount of effort. The fact that Steve shepherded all of them during the past seven years is truly Herculean.

In May of 2001, the LeBlanc family welcomed another degreed chemical engineer to its ranks. Charlie graduated with a BS in Chemical Engineering and is currently a process engineer with Central Soya in Bellevue, Ohio. In addition to teaching Charlie, as Department Chair Steve had the pleasure of presenting Charlie his diploma at graduation.

The Signature of Linda Furney

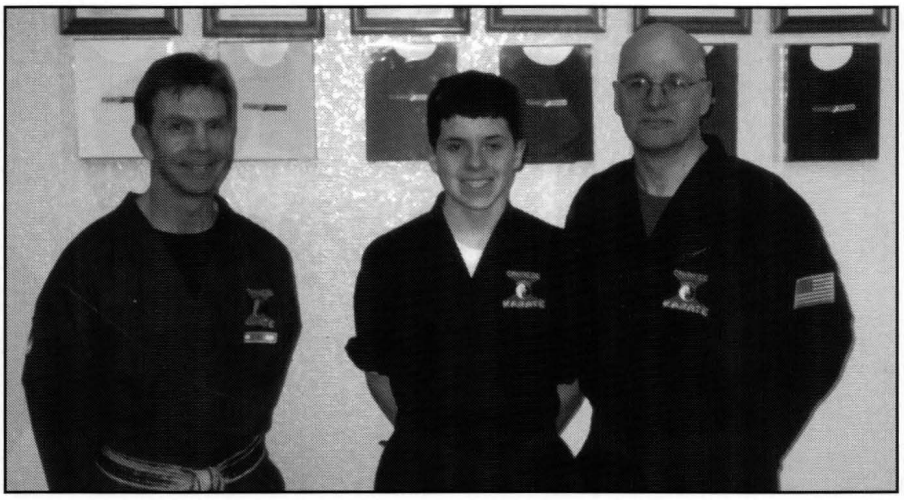
Steve has always been an outstanding teacher. Like most faculty members, he never received training in education, but he possessed an innate ability to teach. His recipe for teaching success involves four ingredients. They are

1. ***Try to remember what you had trouble learning.***
   Reactor design had been especially difficult for Steve as an undergraduate, and he looked back to those days for inspiration when preparing classroom materials. Moreover, he had kept all of his notes from his undergraduate studies, and reviewing them helped him identify the most difficult material when preparing to teach a new class.
2. ***Learn the material with the students.***

Steve was out of academia for three years while he worked for Toledo Edison. Upon returning to academia, he had to re-learn much of the material at the same time the students learned it. This helped him identify difficult concepts and develop novel approaches to explain them.

3. ***Look at the material from the student's perspective.***
A concept that is obvious to a Professor may not be so for a student. Imagine yourself with the background of a typical student and envision where you might have difficulty.

4. ***Continuously educate yourself.***
Steve was able to use what he learned in graduate school in Ann Arbor directly in the classroom in Toledo. The simultaneous processes of learning and teaching can be synergistic (even if you're not a graduate student in chemical engineering!).



Sensei Tom Nehring (of Kempo Martial Arts), Joe, and Steve.

Steve's teaching ability was recognized in his second year (1982) with the highest teaching award given by the University: The University of Toledo Outstanding Teaching Award. This award is given to three members of the University faculty each year in recognition of their teaching abilities. Steve's receipt of the award at such an early stage of his career is remarkable. It reflects the respect, admiration, and inspiration he generates in the classroom. Student comments on class evaluations clearly support such a conclusion: "Dr. LeBlanc is one of the greatest teachers I have ever had. He is courteous, interesting, and able to communicate the subject to students very well. I have great respect for him and feel he is a great asset to this department." "He has sparked my interest in chemical engineering since day one."

Often, good teachers are accused of being easy graders. This is not the case with Steve. Design and Unit Operation Lab reports often drip red ink. Students know they will fail his class if they don't perform. While this often makes for more work, especially when seniors fail design and want to make it up, Steve doesn't relax the high standards he sets for his students.

The greatest rewards for your classroom efforts come in the accomplishments of your students. For Steve, the most recent came when Jeff Burhenne, Dan Gastaldo, and Robert Kasprzak won the William Cunningham Award for the first-place team entry in the 1999 AIChE Student Design Competition. Their team prepared the winning solution to the "Dicyclopentadiene Recovery from Byproduct Naphtha Steam-Cracking" problem given to students that year. Steve places receipt of this award near the top of his list of most rewarding moments as a faculty member.

Steve has never lost his desire to excel in the classroom. He still receives the highest teaching evaluations. Additionally, he has pursued his educational interests through a variety of activities outside the classroom.

Steve has been an active member of ASEE for many years. In addition to numerous technical presentations, he has served as Program Chair, National Chair, Executive Committee member, and Nominating Committee member for the Chemical Engineering Division.

Steve's most memorable ASEE session was an evening session devoted to computer use in the undergraduate laboratory. According to Steve, "It was a roundtable discussion where everyone talked about what they were doing with computers in the undergraduate laboratory. It was a great way to pick up tips in the earlier days of interfacing." In his 1991 presentation "Computerized Data Acquisition in the Unit Operations Laboratory: An Experiment in Thermodynamics," Steve discussed how to interface computers and equipment, especially the construction of interface boxes and connecting cables. Although routine now, these issues required much greater technology savvy then. Steve continued to explore "bleeding" edge applications of technology, including the use of NetMeeting in the classroom for remote interaction and providing access to real experiments through the Internet. A second presentation at the 1991 meeting, "The Use of MathCAD and Theorist in the ChE Classroom," garnered the J.J. Martin Award from the Chemical Engineering Division, given to the best presentation in the Division.

Steve has developed an interest in interacting with high school students to recruit them into chemical engineering. He obtained NSF funding from the Young Scholars Program to run a Chemical Engineering Summer Workshop for five years (1991-1995). The program was a continuation of a local version originally started by former colleague Jim

Lacksonen. High school students from around the country attended the workshops. The objective of the program was to attract them to science and engineering, and preferably to the University of Toledo chemical engineering program.

The workshops were a success in many ways. They attracted nearly 200 academic superstars: the average GPA hovered near 4.0/4.0. One student even received a perfect 32 on the ACT. The groups were also well-rounded: about 60% seniors, 40% juniors, 40% female, and 10% minority.

The workshops also offered many new challenges. How does one deal with hormonally super-charged teenagers? How does one prevent students from publishing inappropriate material on the Web sites that you taught them to create? The rewards outweighed the problems; about 75% of the seniors indicated that they would major in engineering, and Toledo's chemical engineering program received twenty of them.

While Steve was in graduate school, Scott developed an interest in problem-solving strategies. Steve became keenly aware of this when Scott brought problems to group meetings for discussion and solution. Codifying problem-solving techniques and teaching them in the classroom intrigued Steve, and in 1991 he decided to spend his first sabbatical with Scott exploring the idea. Scott was thrilled to have "one of the most creative persons that I have ever worked with" join the project and knew they could be on to something big.

Initially, they asked what is industry doing—what types of problems were encountered and what types of skills were required to solve them. Steve and Scott took two or three students from a group of about ten recruited from the reactor design class to visit a number of local companies. During the visits, they looked for problems that could be used to illustrate problem solving throughout the curriculum.

As material was gathered, Scott and Steve realized that they had more than several good problems to use in class—they had enough material for a problem-solving class and an instruction book. This was the genesis of *Strategies for Creative Problem Solving.* Writing commenced in early 1992, Prentice Hall agreed to publish the book, and it was finally published in 1995. In its fourteenth printing, it has sold over 38,000 copies. The rapid adoption of the book by educators across the country led to the authors receiving the ASEE Meriam-Wiley Distinguished Author Award in 1996.

Steve's collaboration with Scott as a textbook author continued with the publication of *Open Ended Problems in Chemical Reaction Engineering* by Prentice Hall in 1995. The problems are intended to complement "normal" example and homework problems by providing an opportunity to synthesize creative solutions. The solutions require application of the fundamental principles taught in class, but also promote learning at the highest levels of *Bloom's Taxonomy*: synthesis and evaluation.

Steve is currently working on yet another book. In 2000 he received a call asking for suggestions on how to update Donald Coughanowr's *Process Systems Analysis and Control.* McGraw-Hill was interested in publishing a third edition of this popular undergraduate controls text, and with his typical thoroughness, Steve prepared an exhaustive list of modifications. This led to a request from the publisher for a prospectus on how he would change the book and ultimately an offer to write the third edition collaboratively with Donald. Steve quickly accepted the offer to work on what is one of his favorite texts. The third edition is scheduled for publication in the summer of 2002, and Steve promises the book will not lose its current feel.

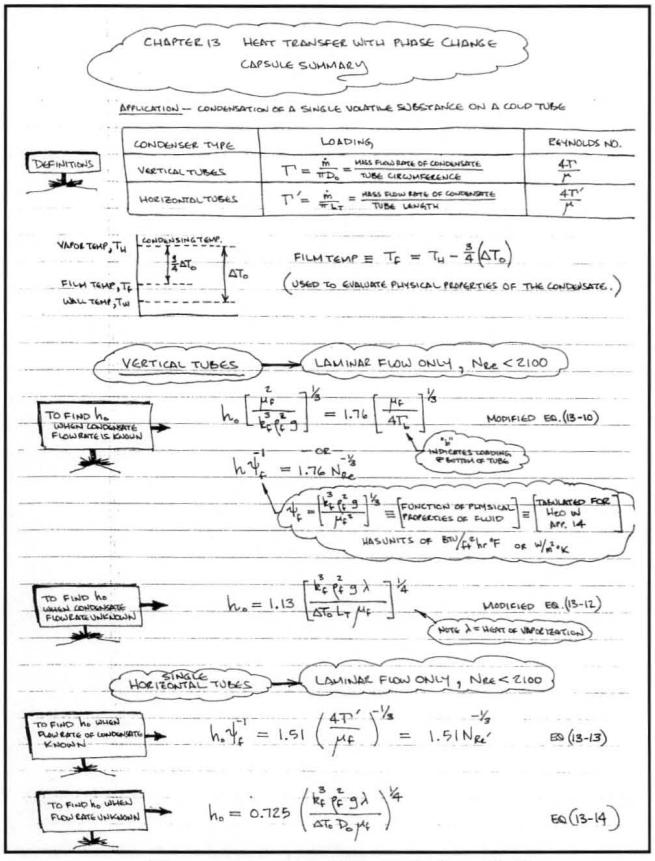
Steve has a knack for preparing 1-2 page technical summaries that students find extremely useful when solving problems (check out Scott Fogler's Chemical Reaction Engineering web site for a medical diagnosis of this condition at <http://www.engin.umich.edu/~cre/344/> and follow "The Knack" link). These summaries of equations and concepts let students quickly find the information they need and then direct them to where it comes from in the text. Two examples are reproduced here, and Steve would gladly provide more if asked. Don't be surprised if you find such summaries at the end of each chapter in the third edition of *Process Systems Analysis and Control* and develop a desire to use them yourself.

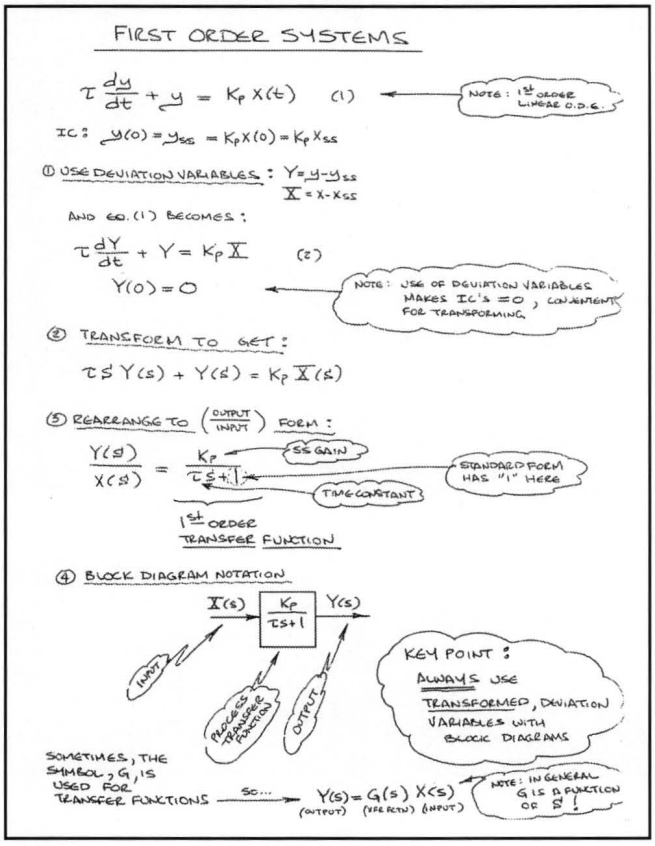
Steve's prodigious efforts in education were recently recognized with the ASEE North Central Section Outstanding Teacher Award for 2000. The Senate of the 124th General Assembly of the State of Ohio recognized this achievement with a proclamation signed by the President of the Ohio Senate, Richard Finan, and the 11th Senatorial District Representative, Linda Furney. We may not have to provide justification for Steve's salary to the State this year...thank you Linda Furney!

Photo of Bruce Lee

In May of 1998, Steve developed a serious illness. He had a fever that would come and go and was high enough to send his heart racing. During one episode, when the rate was so high he couldn't count it, he went to the emergency room and spent his first night in a hospital bed. Doctors were unable to diagnose his mysterious illness and decided to place him on a therapeutic course of antibiotics. It worked. In two weeks, the symptoms disappeared and he ended treatment.

Unfortunately, the infection had not been eliminated. The weaker elements may have been wiped out, but the stronger ones survived and grew. The original symptoms returned—fever and heart arrhythmia—as well as new ones, pneumonia. Steve was very ill once again. The doctors, still unable to diagnose his condition, decided to prescribe a stronger antibiotic and a longer course. This time it worked. After going off the medication, the symptoms did not return and he remains healthy to this day.





▲ ▼ ***Two examples of Steve's knack for presenting difficult concepts.***

Steve thought a vigorous running schedule during the Spring semester might have weakened his immune system and given the illness purchase. Consequently, he gave up running as a regular form of exercise. This might have helped his immune system, but he missed the exercise and started looking for a more acceptable alternative.

He didn't have to look further than his youngest son Joe for an answer: martial arts. After taking Joe to Kempo karate classes for three years and seeing the excellent workout it provided, Steve decided to take it up himself. During the past four years, Steve has progressed up the Kempo ranks. He currently holds a 2nd Kyu Brown Belt and is only two levels from the coveted Black Belt, the belt that Joe earned in June of 2001.

Karate provides exercise, but it also provides ample opportunity for injury. Steve has sported an impressive array of black, blue, and red marks since taking up the sport. With little prodding, he is more than willing to demonstrate on *you* how he got them.

Karate has increased Steve's interest in Asian culture, art, and philosophy. He has acquired for his office a Zen rock garden, a Bruce Lee calendar (illustrating many of the master's moves), and a water wall. Steve shares his love of martial arts with one of our latest hires, Dong-Shik Kim. Dong-Shik holds a 3rd Dan Black Belt.

Steve even brought Molly into his pursuit of alternative exercise activities. During the summer of 2001, Steve and Molly celebrated their 25th wedding anniversary by taking a trip to Hawaii and cruising through the islands. They enjoyed a helicopter ride over an active volcano, ocean kayaking, and a bike trip from the summit of Mt. Haleakala to the coast. At the end of this 40-mile bike trip (mostly downhill, as you would expect), their legs were not overly tired, but their hands would need a few days to recover from gripping the brake levers.

Comb

Steve's current hairstyle doesn't require a comb. So why would he have one in his office?

As a physically similar short bald man, I (GL) can appreciate Steve's choice of hairstyle. Unfortunately, our close resemblance has led to some confusion among students. On more than one occasion, a student has entered my office—which has a sign outside that reads G. Lipscomb—and asked "Dr. LeBlanc" for help with a problem from one of his classes. I don't mind the chemical engineering problems—it's the karate problems that I hate.

While Carnac may have provided a glimpse into Steve's office today, it is an ever-evolving landscape of paper files, diverse objects, and memorabilia. The next time you see him, ask him about the latest addition—even better, come visit and take a tour yourself. Steve would gladly show you around the department that he has poured his energy and soul into for many years. ❐