60's

And thinking back on our college years and for each of us, there was always that one professor that stood out and had a direct influence on our passion, pursuit and success in our chosen profession. For me, that professor was Professor Fred Irons.

Here are some words that come to mind when I reflect on Professor Irons in the classroom.

- Engaging
- Challenging
- Motivating
- Thoughtful
- Precise
- Caring

One of the other attributes that I came to appreciate with Professor Irons was his unique ability to relate to his students and communicate in so many ways at our own level.

On one occasion, we were at his house for a visit and Professor Irons showed us a set of high fidelity sound speakers that he had designed and built himself. If I remember correctly, Professor Irons had processed the raw signal across 20 filters spanning the music bandwidth up to 20,000 HZ. This living example of what electrical engineering could produce connected with me and stayed with me during my entire career.

One of the true measures of a wonderful professor is the unique ability to instill in his/her students the real desire to always have your work done, fully understood and be excited to participate in class. Why? Because Professor Irons made the class, homework and learning fun!

Congratulations Professor Irons in the honor bestowed to you as Professor Emeritus of Electrical Engineering! Well deserved.

Sincerely,
Fred Campbell
Electrical Engineering '69

I think that Fred's attitude and conduct as a teacher had a very strong bearing on my decision to pursue a doctorate on my own as part of my education.

A number of memories of my years as a student of Professor Irons come immediately to mind:

1. Fred was always deeply concerned that his students were in fact understanding what he was teaching and he was never at a loss to cite alternate examples that would reinforce his point to be sure we caught on. I think he tried to hide it some but I can recall the twinkle in his eye when he knew he had made his point.

2. I had the opportunity to assist Fred on a computer project he was doing for MIT/Lincoln Labs back in the days of punched cards and submitting the job to the main computer (IBM 360) on campus. During the course of assisting Fred I never ceased to be amazed at Fred's ability to turn a dead end on one approach into one or more new approaches to solving the problem.

3. Fred was my Master's thesis advisor. His knowledge of the practical side of analog circuit design as well as the theoretical taught me many lessons that served me very well during my engineering career.

4. As I went on to other graduate schools to work on my doctorate I became more aware of the value of the lessons Fred (and others of UM) had taught and how well I had been prepared to take on that level of learning.

5. One of the lessons I learned from Fred when I was teaching a 5 credit circuits class to Engineering Physics majors was the ability to look my student in the eye and say "I do not know for sure but I will find out for you". I have found that to be a particularly valuable ability when dealing with subordinates, associates and customers in the course of my career. It often catches them off guard but it gives one a lot of credibility when you come back with an answer.

I feel fortunate to have had the opportunity to receive a BSEE and MSEE from U of M and even more fortunate that Fred Irons was able to play a part in the process.

Please convey my regrets to Fred and Sally that my wife and I have had to miss such a Special Occasion. I hope we get to see them soon.

Also please convey my best regards to fellow alumni of ECE, the faculty and the College of Engineering.

Sincerely,
Fred Harrison
Electrical Engineering '69

I was flattered (as I think were my classmates as well) when Professor Irons asked us to enroll in his Circuit Synthesis course, which I think at the time was a graduate level course. It seems like we took the first installment and then another one as well before graduating. He was truly in his element. He challenged us every day and was also there every step of the way providing unique insights to us as we navigated our way through his course material.

I did link up with him one time after graduation. My first wife's family lived in Old Town and I was living in Winslow in the 70's. One weekend that I came up I contacted him and threw my canoe on top of my Blazer and we got together for a fishing afternoon in the Old Town / Orono area. I don't recall catching a lot of (or perhaps any) fish, but as usual his company was all that was needed to make it a pleasant day.

Glad to see Professor Irons is getting this overdue recognition, and am flattered and pleased to be invited to the party.

Ralph Marshall
I had an enjoyable fishing day with him in the mid-1970's. I was living in Winslow and came up to spend the weekend with my first wife's parents in Old Town and called him to arrange a day fishing. I threw the canoe on and we spent a Saturday pounding through the streams in the area. Don't remember catching any fish but we had a very enjoyable visit. This was the last time I saw him so I am looking forward to October.

Ralph Marshall
Electrical Engineering '69


Ralph Marshall 1969

—

I transferred from RPI Electrical Engineering to UMaine Electrical Engineering in 1966. I was used to top notch professors at RPI and was *not* disappointed with the faculty quality and first class undergraduate instruction I received at UMAINE. When Professor Irons joined the EE Department, he supplemented a strong cadre of excellent, established instructors such as Professors Libbey, Brown, Parsons, Sheppard, Young, Whitney, et al. As undergraduates we quickly appreciated Professor Iron's serious, professional approach to undergraduate instruction. "Urban Myth" has it that while he was pursuing his graduate studies at MIT, he received an uncharacteristic low grade in one of his courses. As we were led to believe, that event so incensed him that in addition to his considerable graduate work load, he purposely went back and completed EVERY undergraduate homework assignment as well! Such fortitude and determination definitely impressed us as an undergraduate student body and inspired us all to take our studies seriously and ground ourselves solidly in the fundamentals that would later underpin our careers. As we quickly learned Professor Irons consistently displayed the competence and determination this anecdote predicted in ALL our interactions with him. He was honest, above board, established high expectations, but was fair in his dealings with every student.

Having spent over 40 years at The MITRE Corporation and serving for a time on the UMAINE EE Dept. Visiting Committee, I got to occasionally interact with Prof Irons while he was employed by Analog Devices and Lincoln Labs. He has unquestionably been an exemplar role model for all his students over the years and an immense credit to the University of Maine. We certainly wish him good health in his well-deserved 'book-writing' retirement years.

Eric N. Skoog
Electrical Engineering'69

70's

Professor Irons was my graduate school (Masters of Engineering) advisor and I took graduate level electrical engineering courses from him in the early 1970s.

He was a very dedicated and thorough teacher and related very well to all his students, offering assistance whenever needed. I spent many days visiting with him in his office taking advantage of his knowledge and advice. He even invited students to his home to enjoy informal discussions

My most memorable interaction with him occurred during my preparation to undertake the required oral examination mandated by the degree requirement. This was an exam where all my professors (whether in engineering or electives) were invited and, to say the least, I was very nervous and intimidated by the prospect of this event.

Professor Irons helped me prepare for the exam, and noting my anxiety, gave me his most valued lecture: This exam was not about me, he said. It was about the future impact on many, affected employees and others, of my ability to persuade decision makers of the value of projects/strategies I would be proposing in the future. So, stiffen up and get on with it!

Well, that really made me feel better!

But, it turned out that I passed this final oral exam and received by graduate degree. But more importantly, soon thereafter and for most of my career, I faced uncounted "oral exams" in front of Boards of Directors, regulators and legislative bodies. And, as I prepared for these encounters, I remembered well the wise advice of my advisor, Fred Irons.

Thanks you, Fred, and congratulations for your deserved recognition.

Carroll R. Lee
Electrical Engineering 71, 74G
Retired President, Bangor Hydro-Electric Company

Dr Irons had the ability to make the difficult seem very simple and I always appreciated that.

Quentin Young
Electrical Engineering '73

It's great to hear that Professor Irons is being honored. I first had Prof. Irons for circuit analysis. After that, there was no semester in which I didn't have Prof. Irons for some class. He invited me to work for him for two summers, which was a wonderful learning experience.

Prof. Irons was above all else a teacher. He instilled understanding rather memorization of formulas. A good example of this was his technique of analyzing AC circuits "by inspection". The rote procedure would be to write out loop equations, then solve them for the circuit response. But Prof. Irons also taught a technique based more on insight. He would examine a circuit and state "here's a pole, and here's another pole, and here's a zero, and this is the DC gain" and immediately write the transfer function.
A student that could do that had gained understanding and that was Prof. Irons' goal.

Professor Irons was my thesis advisor for the MSEE degree. He suggested the thesis topic, and guided and encouraged me throughout. The results were eventually published in an IEEE journal. After I completed my oral exam, he hosted a party in his home to help me celebrate.

I was off campus after I completed the MSEE requirements, but Prof. Irons kept in touch during this time. At one point he alerted me that a recruiter from RCA would be on campus. The scheduled time slots were filled, but the interviewer agreed to stay later than he originally planned, and thus came about the interview that led to my first job after graduation.

Congratulations to the man who was the greatest influence on me and many other students.

Michael Gilbert
Electrical Engineering ’74, 76G

My wife, Liz, and I were invited to the Irons' for supper one night. As we sat down to dine, the young Irons' burst proclaiming that they had just invented something amazing and invited us to come and observe! They led us to the bathroom where a length of toilet paper went from roll to bowl. They proceeded to flush and, miraculously, the roll proceeded to unwind automatically! Fred mumbled that he had actually invented that 50 years before.

(From a friend, Tom McIntire '93).

One day, Fred returned late from Lincoln Labs arriving at 5:00 am. Then, oh the shame, he showed up for his 8:00 am lecture on "Synthesis of Passive Networks" without a tie! Of course the lecture went without fault, but this was the worst "dirt" we could jointly come up with!

Tom also remarked that his class had a favorite saying: "Moving at the Speed of Fred!"

Dave Herrick
Electrical Engineering ‘74

I first met Professor Irons in the fall of 1971. It turned out that he was teaching my first EE course. As I learned during that academic year, this turned out to be my good fortune. First of all, Dr. Irons was an enthusiastic teacher, which helped to motivate me and the other students. His knowledge of the subject matter was top notch. Also, he had the ability to shift gears and present the material with varying examples to reach both the gifted student and the one who might be struggling. Equally important, he was a genuinely nice person.

As I look back at my experience as a EE student at the University of Maine, I am very thankful that I was fortunate enough to have Professor Irons to give me a solid foundation to build upon. Almost forty years after graduation I am still working as a EE and have enjoyed a satisfying career. My congratulations go out to Dr. Irons for being honored at the 2013 Gorman Emeriti Brunch.

Sincerely,
Richard Constant
Electrical Engineering ‘74

Many of us students affectionately called Professor Irons "Freddie" (but, of course, never to his face - we would never have dared to do that!). :-)

Professor Irons was always smiling and laughing, and telling amusing stories - but my memory fails me when I try to come up with anything specific. He has always been a caring and compassionate educator, not to mention extremely capable! And he has always been so very down-to-earth and accessible.

1) One day in class, Professor Irons was describing how he was in the process of rewiring his house in Orono. Now this has always struck me as a bit ironic (no pun intended!) as it seemed to be overkill - somewhat akin to a brain surgeon removing a splinter from his child's finger. Here was a doctor and professor in electrical engineering rewiring his house! It makes sense, of course; I just always found it amusing.

In particular, I remember him describing how he was taking care to balance the load between the two phases of the circuit. Got to keep that neutral current to a minimum! I don't know if all the

electrical codes were followed, but I am sure that Kirchhoff's laws were well obeyed!

Another thing I'm quite sure of - his was probably the best-wired house in all of Orono!

2) I first heard the theory of psychological time, explaining why time seems to pass faster as we age, from Professor Irons. Stated simply, he noted that the human mind judges each passing interval of time as a percentage of its total life experienced thus far, rather than as an absolute quantity. Now that I'm 61, I can attest to the validity of this theory!

3) One summer, Mike Gilbert and I participated in an undergraduate grant from the National Science Foundation. We spent an inordinate amount of time at the computer center in Wingate Hall teaching ourselves assembler language in a project completely unrelated to the NSF grant. Professor Irons cautioned us to spend less time time there, lest our grant projects or E.E. studies suffer. We didn't listen, of course (but I don't think our projects or studies suffered)!

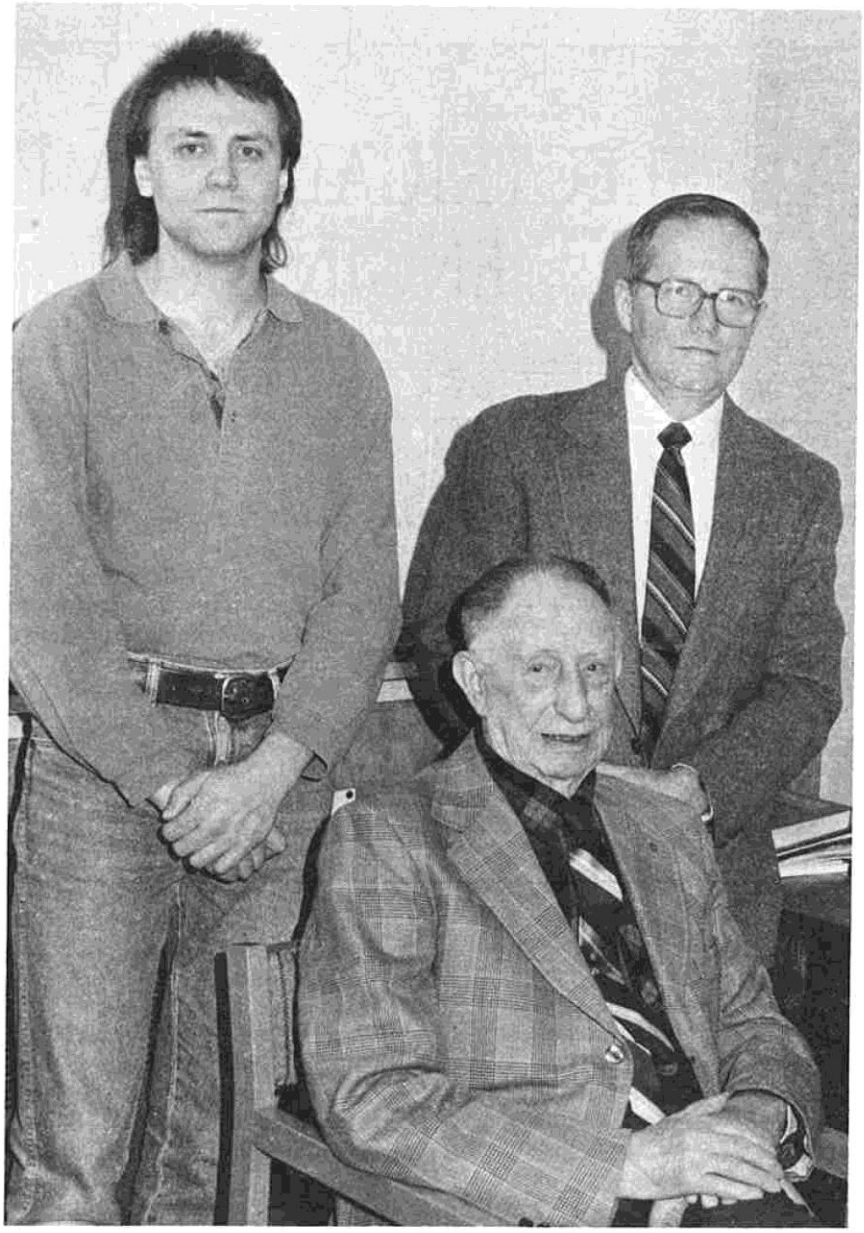
Jeffrey Stuart MacKinnon
Electrical Engineering '74

In 1975 I transferred to the University of Maine in the middle of my sophomore year where I found myself needing to do some catching up in circuit analysis. Professor Irons promptly and patiently saw to it. I've always remembered this inspiring example of dedication to education, and I've always remembered his very instructive classes.

Thank you very much, Dr. Irons! I've benefitted greatly from your encouraging instruction in electrical engineering!

Sincerely,
Larry Martin
Electrical Engineering '77

90's



Richard Cook (left), Fred Irons
and Roger Castle (seated).

Castle Professor and Student Named

Fred Irons joined the faculty in January, 1990 as the first Roger Clapp Castle and Virginia Averill Castle Professor of Electrical Engineering. This named professorship is the first in the Department and is funded through an endowment set up by a generous gift from Roger Clapp Castle, class of 1921. In addition to the Professorship, the endowment also supports a student to work with the Castle Professor. **Richard Cook** was chosen as the first Castle student. Richard is a junior from Glenburn with a double major in electrical and computer engineering. Before coming to Orono, he obtained an associate degree in jazz and contemporary music from the University of Maine at Augusta.

I attended the UMaine electrical engineering program from 1986-1992. Not realizing I had missed the second semester of physics (where you learn about charge!), I failed miserably on my first circuit analysis test, with no idea why. After being tutored on the missing physics, I retook circuit analysis 1 & 2 the following year with Dr. Irons. I found him to be very traditional in his bearing and teaching methods, but he always made himself available for questions outside class. I found him to be totally inclusive of me as one of the few women in the class.

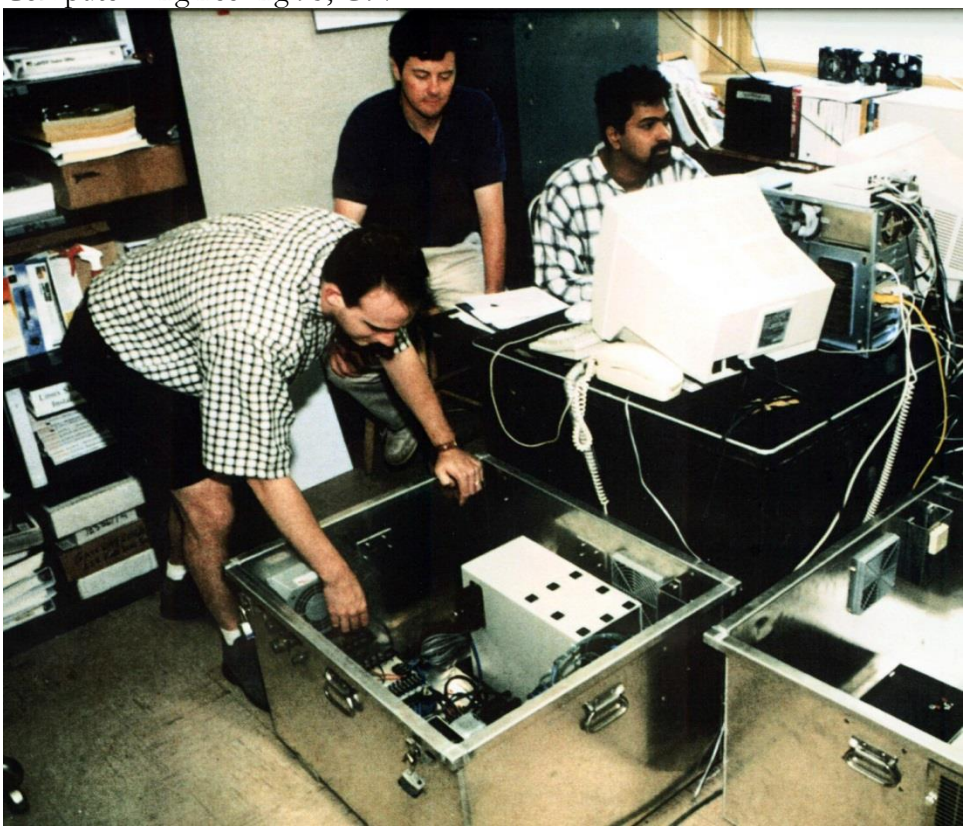
I was also the ONLY pregnant woman in the class! No mention was made of this by him. Our last class that year was on May 2. The final was scheduled for May 4. During the day off before the final, my son was born. Since I had already studied for this final, and I knew sleep deprivation was about to set in, I went to class on May 4 with my husband and newborn for the test. Dr. Irons was talking to another student with his back to me as I approached him with my newborn son. When he turned around and saw us, his face lit up, the professor/student barrier went down, his face lit up, and he hugged us! I returned to my seat, handed the baby to my husband, and proceeded to take the test. I think I earned a B for the course. For me, he set a true example of the kind of professionalism that is always mindful of our humanity, and that has made a difference to my career and life.

Thank you so much, Dr. Irons!
Judy Hilton
Electrical Engineering '92

1992 Electrical and Computer Engineering Class

I was in the first class that Professor Irons wrote the textbooks for second year circuits classes (ELE210?). It was a roller coaster of a course since a simple erroneous negative sign caused late night panic until next day in class we learned it was a clerical error. We used to joke that Professor Irons had "nuclear chalk" due to his nimble chalk skills and his ability to fill the chalk boards in minutes. We had all we could do to keep up with him! Our weekly homework assignments only had 4-5 problems, but we needed the entire week to complete it. They were hard courses and we definitely earned our grades but were proud because of it. I still look back on those electrical engineering classes as a gift and I'm so glad that he was there to guide us.

Derek Price
Computer Engineering 95, G97



Derek Price, Barrows Hall 1995

I feel very lucky and honored to have had Fred Irons as a professor and to have had the opportunity to work with him in the "COM" lab. My education at UMaine has served me very well in my career, and Fred Irons was a very big part of that education. He always showed a very genuine interest in his students and did everything he could to make them successful. Having him as a professor in my sophomore year really helped my college career. His methodical teaching of the basics of circuit theory made it easy to understand and learn the material. I still love this quote on algebra, which he delivered on the first day of ECE 210: "Algebra is the language we speak. You are expected to be fluent in it."

The opportunity to work with Dr. Irons, (and Don Hummels too) in the COM lab was the reason I stayed for my MSEE. Through this work in the lab, I was able to get to know Fred both as a professor and as a person. He is a great example of both!

I really enjoyed some of his stories on growing up in Ohio. For example, he told of being quite talkative when he was little, so when they were going for a ride his father would give him an apple to eat. This would keep his mouth occupied. Instead of talking, he would be eating. When the apple was gone, and his he started talking, his father would say: "Want another apple?"

Another story from growing up was about him telling his father he was bored. His father's reply, while pointing at a math book was: "Have you done all of the problems in that book?" When Fred said "No.", the response was: "Then I guess you aren't bored."

I consider myself very lucky to have had the opportunity to learn from, and to get to know Fred Irons. I can't think of a more deserving recipient of this honor. Congratulations!

James J McDonald
Electrical Engineering '96, G97

James McDonald and Eric Swanson 1996

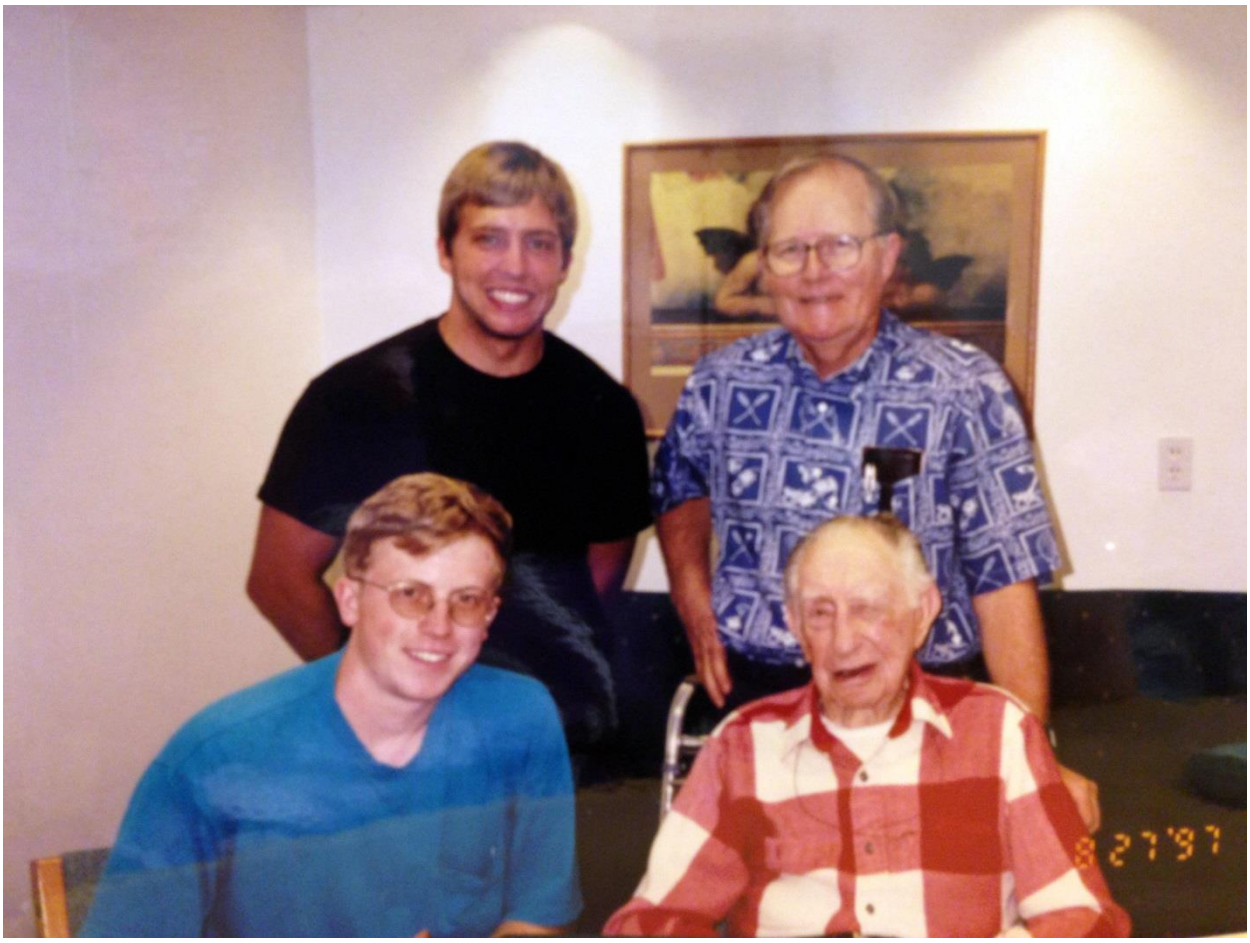
When I was in Grad school I spent summers working in the Communications lab which was run by Professor Irons and Professor Hummels. During one summer session I was invited by Professor Irons to go fishing on the Penobscot river. The plan was that we would leave one car downstream and then drive upriver, hop in the canoe, and let the current take us downstream as we fished along the way. Our estimation of the total distance or float time turned out to be way off because we spent several hours on the water and eventually resorted to some serious paddling to get to the car still well after dark and hours later than intended.

Once in the car Professor Irons was immediately insistent that I join him for dinner that night. I tried to politely decline given that we'd been out for hours and it was now probably 9PM but he continued to press to the point that I felt I couldn't say "no". When we finally got to his house and were sitting at the kitchen table, me to his left, Sally in the seat across from him, I suddenly understood why Professor Irons had been so insistent that I have dinner with him. I was being used as a human shield! Sally was quite obviously steaming mad after having worried about his safety for so many hours and I was saving Professor Irons from the sparks that were ready to fly!

I should point out that Sally was extremely polite with me but this was possibly still the most uncomfortable dinner experience I'd had up until that point in my life. I wish that I could also say that it is still the most uncomfortable dinner experience I've had, but I cannot. I've now been married for 10 years and have managed to recreate similar situations for myself a handful of times but because of the expert teachings of Professor Irons in electrical engineering and in life, I've learned to always bring home a "human shield" when the situation calls for it.

Thank you Professor Irons!

Eric Swanson
Electrical Engineering ‘96



(L-R) Eric Swanson, Prof. Fred Irons, Aaron Carter, Roger Castle.

To say that I am an EE because of Professor Irons is an understatement. Fall semester of my sophomore year I was questioning the sanity of my degree selection and fighting to keep up with the difference between an inductor and a capacitor. It came to final exam time in Professor Irons' circuits class and I lived the college nightmare. I got a phone call "Prof. Irons is worried about you. The exam started 30 minutes ago and you are not here"! Through his grace, I passed that exam and course despite missing the first 75 minutes of the exam time.

What followed that first traumatic class was five more years of Professor Irons amazing guidance, teaching, support and encouragement. From introducing me to analog to digital converters to driving me to meet Mr. Castle, Professor Irons was always a thoughtful and enthusiastic supporter of the field of engineering and his students. I am blessed professionally and personally to have had Professor Irons' influence in my life.

Gina Kelso
Electrical Engineering ‘97

(L-R) Gina Kelso, Eric Swanson, Corey Voisine, Roger Castle, Fred Irons

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Dr. Irons was my most influential professor during my undergraduate time at UMaine, I took a concentration in his department and worked a summer in his lab. Although his classes were some of the most challenging, I sought them out so I could learn from the best. His passion for engineering and for teaching inspired me as a student.

Best Regards,
Monica Puri
Electrical Engineering ‘96

I decided to pursue Electrical Engineering as a career because of my math aptitude and because I was told that of all the engineering disciplines, EE required the highest math discipline. I was not dis-appointed in my career choice and they sure were right about needing high math skills.

We were taking an exam in Fred's 211 class, perhaps the second one of the semester. I got hung up on the second problem. I knew that I could do the problem but kept going round and round. I actually wore a hole in the blue book "correcting" my errors. The next thing I remembered was a

warning that we had 15 minutes left!! I had not looked at questions 3,4 or 5! I picked the one I knew I could do and rushed through it and started on another when "time is up" so I discouragingly passed in the exam and went home. I talked with classmates the next day and saw were I went wrong felt even worse. A few days later the test came back with words along these words:

"Spider, you got hung up on the second question. Don't let this happen to you again, go on and do the questions you can do and then come back. Often times solving one question will trigger something that will remind you how to solve the one you got stuck on. I know this is not your usual work and will treat it as an outlier if you continue with your usual good work." - Fred Irons

Those words of encouragement were very powerful and uplifting to this very non-traditional student and they did what Fred intended as apparently I continued with my "usual work" and I passed the course. I also have told this story to my classes that I taught at UMaine hopefully helping another student from making the same mistake.

Spider Williams
Electrical Engineering '98

2000

Dr. Irons, you have been an exceptional mentor and inspiration to me. I wouldn't be where I am today if you didn't push me to take my co-op in Texas! Fast forward 10 years and here I am, a wife, 2 kids and a career in engineering!

I truly enjoyed your sense of humor (yes!) and patience. Do you remember the time you took me fishing in your canoe up Stillwater river? I told you that I hadn't been fishing, and you said "Wow, you haven't been fishing? I'll bring my boat up from camp and we can go fishing", I don't think typical professors do that! I did lose the hook to that sun fish, he was feisty! And I was ready to give up rowing on the way back - that was some wind. You taught me how to design filters, build ADCs and fish. I am glad we crossed paths at UMaine and I just wanted to say THANK YOU for all that you have done for me. This honor is well deserved, congratulations!

Kannan Sockalingam
Electrical Engineering '00, G02

(L-R)Sockalingam family: Visa, Kannan and Arya (1 week old baby Ashwin not in picture)

Colleagues

Old Friends

Fred Irons and I have known each other for 56 years. In the fall of 1956, we were graduate teaching assistants at MIT. Fred started off with two of the most challenging courses offered. He plowed on through each course, ending up with prize winning grades, conquering both courses and making a strong start at MIT. This is typical of Fred – never taking the easy way out. Fred always put in this kind of effort, but he always put his students needs first, ahead of his own scholarly pursuits. Hardly typical behavior for a TA.

In October of 1957, Fred was an usher at my wedding. I finished my degree the following summer and left for Purdue. Fred stayed on at MIT and worked with Professor Guillemin and his new company. Fred was a principle driver in selling the company, Guillemin Networks, to E,G&G. While Fred was doing that, I finished up at Purdue and went on to the University of Maine. One day I got a call from Fred and he asked me how it was at Maine I told him what a great place it was to live and teach. I talked to Walt Turner about Fred. Walt was the acting Department Chair at the time and he set up a meeting with Fred in New York at a National IEEE meeting. The result was Fred ended up moving to Maine and becoming a new EE faculty member. After living through a couple of tough years with the University of Maine being slammed by Governor Longley, Fred moved back to Massachusetts and joined Lincoln Labs. He soon found himself a long way from Maine at Lincoln Lab's test site in the middle of the Pacific Ocean at the U.S. Army Kwajalein Atoll installation located about 2,500 miles WSW of Hawaii. In the 1990's, Fred returned to EE at the University of Maine and became the first holder of the new Castle Professorship.

Fred, Sally, Martha and I tried to go out to dinner once a month in those days and we often included other people. On one occasion, we had dinner with Bill and Adeline Peak. Bill suggested a wonderful restaurant in Hancock, close to where he had retired, called "La Domaine". So we drove down together to meet the Peak's at the restaurant. When we got the got our menus, the prices were eye opening, seemingly straight from New York City. The meal progressed; the food came and was good, though the portions were tiny. When it came time for desert, Fred wanted to know what kind of pie they had, (Fred frequently has pie for desert). When the waitress informed us that they had no pie…Fred asked, "How can you not have pie?" On the way home I suggested to Fred that we could go to McDonalds next month, where they always have "pie".

Most of all, Fred has always been, and still is, all about his students. On one of our recent, regular lunch trips, Fred chose to go to Skowhegan. Fred had spent a lot of time there while visiting Sally's family and was familiar with the area. But Fred really wanted to go to Skowhegan because he was looking for a former student he had lost touch with, despite many internet searches. Years ago, Fred had been told that the student's father lived "on Route 2 on the way to Skowhegan in a white house on top of a hill". Finding someone with such precise directions may not be as difficult as finding a needle in a haystack, but it was no simple task, either. We drove along, looking for houses that might fit the description. We finally saw a place that looked right, but there was no car in the driveway and no one at home. A brief conversation with the neighbors was useless – they had no idea who lived there. We went on to Skowhegan, had a good lunch topped off with blueberry pie and returned home. Undaunted, next month, Fred wanted to return to Skowhegan. Again, we drove slowly past the same house, but there was no one home. All was not lost - we had another good lunch with blueberry pie. On the way home, though, a car was parked in the driveway. Fred turned around and we went back and pulled into the yard. Fred got out and disappeared for almost

an hour. It turned out to be a great success – his former student's father was very pleased to see him and helped Fred reconnect with his former student.

The University of Maine is lucky to have had Fred Irons on its faculty. I have the greatest respect for Fred and am proud to have had him as a friend these many years.

Ned Sheppard
Professor Emeritus Electrical Engineering

(L-R) Seated: Rose Moriarty, Ken Parsons, Margaret Freeman, Vern Vowles, John Field, Standing: Bunny Grant, Steve Mittleman, Keith Hamilton, Fred Irons, Howard Crosby, Waldo Libbey, Edmund Sheppard, Richard Gibson, Walter Turner, Carleton Brown, David Young, Larry Kazmerski, Ken Lamore. (Photo taken approx. 1977)

Since I have known you for almost 45 years, I would like to share with you my observations relative to the effect you have had on ECE faculty and students. I have observed that when it came to teaching, students were your primary concern. Your lectures were always detailed, clear, concise and your exams were hard but very fair. As a result you were well liked and respected by your students. In my many travels in the US, I often run into former ECE students, some of whom have already retired. They all speak very highly about their education at Maine and in particular about one ECE faculty member, Fred Irons. You not only had a positive effect on students, but also on ECE faculty. In my early years at Maine I taught circuits, electronics and electromagnetics. You gave me valuable guidance in teaching and how to interact with students. I also observed the positive effect that you had on other faculty, particularly, Al, Eric and Don. As a result of the model that you set up, the ECE department flourished as evidenced by many positive ABET reviews. Finally, you choose to continue your academic activities after your official retirement as evidenced by the publishing of your circuits textbook which continues to benefit the ECE undergraduate program. In conclusion, it has and continues to be a pleasure to interact with you both academically and socially. Good luck in your retirement years.

John Vetelino
Professor, Electrical & Computer Engineering

Dear Dr. Irons,

As we celebrate you and your very distinguished career my thoughts about you invariably bring me to countless ways you have influenced so many engineers that have had the privilege to study under your guidance. It goes without saying that someone with such dedication truly shall always be remembered with grace and respect for those like myself that have been touched by such a man of honor. You certainly were blessed with so many wonderful qualities that are admired and Michael joins me in offering our heartfelt congratulations as you and your career are being celebrated today.

I think it is wonderful how you have directed your energies into so many special interests that you are so passionate about during your retirement years. May all your days ahead continue to be filled with elation and triumph as you so richly deserve every happiness.

You are the cat's meow to me! You have and will always hold a place in my heart with the utmost admiration and greatest fondness one could know.

Love to you,
Laurie Fullerton
Engineering Dean's Office

"There are two ways of spreading light: to be the candle or the mirror that reflects it".
-Edith Wharton

Congratulations on being selected for this year's 2013 Gorman Emeriti Brunch honoring you!

I first remember you when my mom worked in the ECE Department many years ago and I was in high school. You left but returned after I was hired to work in the department. You were always very polite and humorous visiting the office. Often times you would tease me about going out to have a "martini lunch" at noon. I recall one particular time you hosted a party at your house with ECE students attending. To my surprise you prepared for me a special "home made" martini. I never tasted a martini in my life but due to the joke, I pretended I liked it. After I had enough, I placed it behind one of your houseplants. When I next saw you at the office you mentioned you found "it" after the party and figured that was not to my liking! I guess there were no more martini jokes after that!

I found it amusing one time when we went out for our yearly lunch date and you made a comment to the waitress and introduced me as "your daughter" and Julie as your "granddaughter". I know the waitress believed you on that one! I concur we do have a special bond like a father /daughter as our friendship has spanned many years!

During your tenure at UMaine you asked me one day if I was interested in typing a textbook that you hoped to publish on circuits. After that was successfully published, you started on another circuits book. Since then you have continued to keep me busy, and for the past 12 years into your retirement days, typing a volume of letters written to your mother when you went off to college, a quilt book, biographies, a story about a squirrel that never materialized, and now your daily blogs. In your daily blogs I have learned a lot about your life and family. These are interesting for me too as I enjoy reading about the places you have travelled and just general everyday life events that you are involved in.

Finally, you cease to amaze me after you retired as you learned how to play the trumpet and enrolled in art classes at UMaine. This all led to you being a member of the Bangor Band, the Bangor Art Society and a writer.

Congratulations on your retirement and your "after retirement" achievements. You are a wonderful friend and I look forward to seeing you in the office whenever you stop by so keep stopping by!

Best wishes,
Janice Gomm
Electrical Engineering Department

I write the following words with a great deal of trepidation because I'm afraid that Fred could use them as much needed ammunition against me in our sometimes heated discussions about subjects that he knows very little about. I got to know Fred quite a few years prior to his retirement through our joint participation in Maine IEEE events. What I like about Fred is that he is straight forward and likes to tell it like it is. Until I catch him being otherwise, I think he is a very honest fellow. And some people even credit him with having a good sense of humor. I know he has had an outstanding career as an electrical engineer both in industry and in higher education. And throughout his career and retirement he has been very fortunate to have a loving and supportive wife, Sally.

George Elliott
Assoc. Prof. Emeritus, Electrical Engineering Technology

I met Fred back when we were both in the Faculty senate in the 90s. I had become the chair of academic affairs and asked Fred as an engineering senator to be on the committee. That was my introduction to a most remarkable man. Good-natured, easy to laughter, happy, but holding himself to very standards.

He was good to have on the committee – a person who contributed and who was prepared but not someone who focused on a comma or a semicolon or who fussed about a particular word. We did what we had to do and closed the meeting.

I was on the board of the Bangor Symphony Orchestra for many years and one of our onerous duties was to call people for money. Fred was on my list since he and Sally were season ticket holders at that time. I called thinking this should be pretty easy since we were friends but no, I didn't get away easily. The first thing he asked was why are the administrative, overhead costs so high? Um… good question. Was the orchestra efficient in its spending? How many people do you need to work in the office? (then we had 5 – now 1 ½) He had a good point. Somewhat later he told me they didn't go to symphony any more because someone near them always wore perfume and his wife was allergic to it. He asked the administration to uphold the ban on perfunes but it continued. I asked him if he would serve on the board – No WAY!! Life is too rich!! By the way – he did give me a donation that year.

I was on the Bangor art walk last year and who did I meet in one of the artist's studios? Fred of course. He has been taking art classes and had some paintings on display along with a bunch of other Bangor artists. He pointed to one: 'you see that painting?' "The one with the trumpet and the piano?" "Yes – I got an F on that. I was supposed to express my feelings about music. But I was not abstract enough for my teacher."

Not only was he painting, but he was writing every day, publishing books, and taking trumpet lessons. Not just taking lessons but actually playing in a band. Probably not the Marine Corps Band or the Tonight Show band but still, he was playing in a band. He also makes sure he does some

kind of creative/artistic 'thing' every week. Maybe walking into store he's never visited and striking up a conversation with the owner. Perhaps walking through a new museum exhibit.

He goes fishing with Knud Hermansen, who I hope is reading this to you now. These trips do NOT count as a creative/artistic venture – not with Knud there anyway. Knud has been taking Fred into the wilds of northern Maine, and, to Knud's great disappointment, Fred has been writing about each one of these expeditions. Knud: 'I caught a 13" trout up in Long Pond" he says to a group of friends. Fred " just a minute --- no it was a 7 inches – I've got it written down right here." A fisherman should not travel with a historian. He should also be concerned that the locations of all his secret fishing sites are well noted in those journals.

One moment that cemented Fred for me was when he won the outstanding teacher award 1997. I was there when he received the award – he got teary eyed and choked up when he spoke of Sally as the love of his life.

I wish I were a great writer but I'm not. Fred is a wonderful man and I am better for having had him in my life.

Gloria Volmers
College of Business, Public Policy and Health

As former chair of the Electrical and Computer Engineering Department, I am honored and thankful of all of the service and commitment that Dr. Irons has given over the years to our students. He has established a strong connection with his service to his students and his research. His selection in 1998 as the Maine Distinguished Professor is an excellent testament to his service to the University of Maine. Dr. Irons has been a highly respected faculty among his colleagues and I often benefited from his advice. I am delighted to be participating in the Gorman Brunch in recognition of Dr. Irons.

Mohamad Musavi
Associate Dean, College of Engineering

I was truly blessed to be able to work with Fred when he returned to the University of Maine. Fred was as my mentor and friend, and the problems and the people that we worked with together made that period of my career a true joy.

Down deep, Fred is a renaissance man who was willing and anxious to dive into any problem and find out what could be learned. All you had to do was throw down a challenge, and that would set Fred off in a new and thrilling direction. But he also brought a quick wit, a sense of levity, and a philosophy that was forged, I think, by reading a little too much Calvin and Hobbs. He brought that approach into everything that he did, including into the classroom. Fred relayed one story to me from his introductory circuits class: A student had asked a question about a problem that Fred realized was stumping everyone. Fred (in his mind) wasn't sure whether to describe the problem as an "Anathema" or as an "Enigma". But when the words came out of his mouth, everything merged together: "This problem is somewhat of an enema". I guess he got quite the reaction from the front row of students!

In any case... congratulations Fred! It's an honor and a privilege to know and work with you. You've had a profound impact on me, and upon a tremendous number of students and colleagues that you've worked with. Thanks!

-Don Hummels
Professor, Chair
Electrical Engineering Dept.

Art & Music

"I so enjoyed having Fred in my painting class at the Hammond Street Senior Center.
My goal was to help him let go of perfection in his painting, but alas...he turned out to be too perfect."

Linda Packard
Art teacher

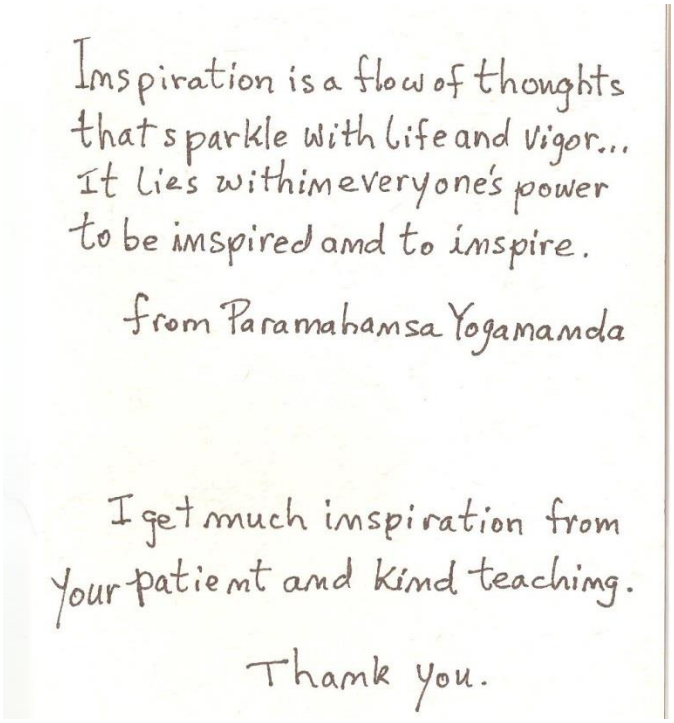
Pastel Painting at Hammond Street Senior Center.

Hear Fred play.
Play Fred, play!

Fred will freely admit that he has lived his life by decades. I have been honored to occupy one of those decades ever since that day in May of 2003, when Professor Irons showed up at my house in search of trumpet lessons. I somehow suspect that Sally may have threatened him with bodily harm if he did not find a hobby in which to occupy himself, as he transitioned from professor to full-time juvenile delinquent. A dutiful student, Fred kept detailed records of his practicing methods and progress during our ten years together as music teacher and trumpet student. It was a challenge at times to tell Fred's left brain to "take a hike" while inviting his innate right brain creativity to take center stage. Indeed, not everything in music can be explained scientifically or mathematically, which occasionally frustrated the professor, but touched the psyche of the student. The times we were able to enjoy the profundity of a beautiful chord or the soul-inspired blues improvisation-all without analysis or research-are memories of Fred I will always carry close in my heart.

Lori C. Wingo
President, Bangor Band
Fred's Trumpet Teacher 2003-2013

Bangor Band Trumpet Players (L-R) Lori Wingo, Fred Irons



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http://web.eece.maine.edu/~irons/memoirs.html

Memoirs: Career Technical Writing High-Lights

In academia we have to maintain a *vita* for Tenure and Promotion purposes and also for seeking financial support from various agencies. Now that I am retired it does not appear that I need that vita anymore but it is interesting that in looking at the different publications down through the years it portrays a trail of evolving interests and experiences. The following list of publications, along with anecdotal notes, provide a view of what I see as some of the best experiences in my professional career. - FHI

Irons, FH, "Magnetometer for Small Specimens," IBM Technical Report, Endicott, NY, Jan 31, 1955, 18pp, Code:TR105.096.359
This was my first engineering job and took me out of state for the summer of 1954. It convinced my

Dad that I was not going to return to the farm. I designed the magnetometer from a schematic in RM Bozorth's physics book. It was used to measure the magnetic properties of thin films in support of the development of the magnetic drum memory device. Later the magnetometer was built into a servo-controlled system to measure samples automatically.

------, "Digital Storage of Statistical Data," *IRE Trans. on Nuclear Science*, Vol.NS-7, No.1, Mar 1960, pp 43-48.
This graduate research work used a 14-track tape recorder to store digital samples from a photo-multiplier tube in the study of low level radiation effects for the Radio-Activity Center at MIT. It was fully transistorized and stored digital samples in parallel on a short loop of tape. The concept centered around the random nature of pulse arrival times to not have to preserve time information. This system eliminated the need for lab technicians to manually create histograms from thousands of samples taken from strip chart recorder outputs. The storage system would record for several days and then produce the statistics of the experiment in seconds. A beginning in automation!

------, "Active Filters: Properties and Applications," *Frequency*, Mar-Apr 1964
This tutorial paper was in connection with the Guillemin Networks (GNI) adventure over the period 1962-67. The publisher was another new firm, like us, and so we published a paper there in cooperation with helping them get started. GNI pioneered the use of active filters in the development of many systems, such as: vocoders; seismic array receivers; off-shore drilling platform stabilizers; gated ranging radar circuits; underwater sonic analyzers; and many others. The paper talked about active filters and their advantages and touched on the basic problem of stability. At that time, there was a fad for negative impedance converters and other positive feedback approaches, but Dr. Guillemin was never convinced. The paper hinted at, but did not really explain, the approach favored by Guillemin. He did not trust the patent system (he really admired Armstrong) and so we went for a Trade Secret approach to protect our product position. The successful development of the opamp as a component made the whole problem a moot point and made it possible for most companies to design their own active filtering right into their own electronics.

Bryant,TG & ------, "An Analysis of Coupled-Pair Microstrip Transmission Lines," Univ. of Maine, D.I.C. Report No. 855(S-196) to M.I.T. Lincoln Laboratory, 1968.
Tom was my first graduate student. This work stemmed from a summer job that Tom had at Lincoln Lab in the summer of 1967 under the guidance of Jerry Weiss. Their work resulted in the publication of a famous and oft referenced paper on coupled-microstrip lines. I was the local supervisor for the work but did make the contribution to use strip-charge finite elements rather than line charges. This removed a troublesome singularity in the formation of the problem and led to highly convergent results for the algorithm.

------, *An Analysis of Scattering from Dielectric Obstacles in Rectangular Guides*, PhD Thesis, Lehigh Univ., 1971.
This work was performed at Lehigh University, from 1969-71, and involved the development of algorithms to compute equivalent circuit effects for resonant obstacles in wave-guiding structures. The purpose was to automate CAD tools for the design of UHF filter structures. This was an interesting problem that really pushed the finite element methods of Roger Harrington and was limited by computer speed and memory space. Two-port reactance versus frequency dependence was estimated for each obstacle, through resonance, in a non-homogeneous field space. It was a challenging exercise and it would be interesting to apply today's super fast and large memory computers to see how they would perform on the problem. We came within a few percent with extremely limited computing power, by today's standards. The key to the problem was in trying to determine the set of eigenvalues that yielded the waves that contributed the most stored energy in the determination of reactance values. This turned out to be a frequency dependent phenomena.

------ & Naimpally,S, "Iterative Active All-pass Structures for Arbitrary Attenuation Requirements," IEEE 19th Midwest Symp on Ckts & Sys, Aug 1976, pp 399-404.
This was a surprisingly neat little solution to the approximation problem using a cascade structure of unit-gain one-pole all-pass networks. Fourier theory is used to obtain a set of real coefficients to fit

an arbitrary attenuation function. The technique is unique, and coupled with Lanczos smoothing to weight the truncated Fourier series coefficients, the resultant responses come arbitrarily close to the objective function. The circuit realization easily lends itself to IC fabrication technology and is a very practical solution for obtaining a simple and general purpose filter synthesizing architecture.

------ & Gilbert,MG, "A New Formulation of the Approximation Problem," *IEEE Trans on Ckts & Sys*,Vol. CAS-24, No.5, May 1977, pp 231-241.
This paper solves the filter approximation problem to fit a ratio of equal order polynomials to arbitrary attenuation requirements as specified on a dB vs. frequency space by means of a straight-line connected function. This is a problem that Dr. Guillemin envisioned the computer being able to solve but he never did get to see that happen. The algorithm uses curve fitting techniques as described in his *Synthesis of Passive Networks* for the Hilbert transform relationship between phase and loss functions. The minimum phase thus derived is split into two monotonically increasing parts, one for the numerator and the other for the denominator. These phase functions yield unique polynomials that are a close fit to the objective function and are very close to a global minimum for optimizing the selection of the polynomial parameters. Thus the solution to the approximation problem is reduced to invoking physical conditions for the initial choice of polynomials in an optimizing procedure. The solution is very practical for active filters where the numerator can easily be obtained from the pole-generating circuits in a state-variable type of structure. In addition, since the method uses zeros as effectively as poles, the procedure yields a minimum order in its solution to the approximation problem. This is my favorite paper for my whole career.

Special Projects~~~Somewhere along the way, in the mid-1970's, I realized it was important to enable the graduate student's to work on what they wanted to work on and not let my own personal research interests dominate their choice. This resulted in some really fun projects, e.g.:

Bill Jeffrey ('74) - Designed, built, and evaluated a variable resolution PCM system for speech signals using synchronized pseudo-random dither at the transmitter and receiver. The system was able to work at a 3-bit resolution using this technique. Typical telephone systems use 8-bits. Bill used recorded tapes and carefully designed test methods to determine the reliability of untrained listeners for evaluating this system at different resolution levels.
Andy McClellan ('75) - Built a spread spectrum receiver/transmitter to tag and track aquatic animals in a noisy environment. This was in cooperation with the Zoology department and we actually tracked fish in the Stillwater River.
Jim Lester ('76) - Jim was a radio ham and wanted to build a narrow-beam antenna array structure but the problem was how to measure the pattern. He built a skirt array, ala Kraus, on the (flat) roof of Barrows Hall and used radio astronomy methods to estimate the pattern as a selected star passed through the antenna aperture. That was one real exciting project in freezing mid-winter but Jim succeeded in his goal. The antenna remained on the roof until sometime in the 90's before it was removed. It was impressive to "see" the sun for several hours after it had set below or before it rose above the horizon.

These students proved to me that I did not have to be expert in the subject to help them learn about and work effectively in a subject area of interest to them. I ended up learning a lot too!