

Guest Editorials

Tributes to Frank Giordano



Frank R. Giordano (1942–2022) was honored last year with COMAP’s Doug Faires Lifetime Achievement Award, as “a true inspirational leader and giant in the field of mathematical education and mathematical modeling” [Garfunkel 2021]. He served for 15 years as contest director for the Mathematical Contest in Modeling (MCM[®]), hence the relevance of publishing in this MCM issue tributes which show a more personal side and other aspects than in the remarks about his deserving the Faires Award.

We mention only, as a reminder, that in addition to his role with the MCM, Frank had been an officer in the US Army (retiring as brigadier general), head of the Dept. of Mathematical Sciences at the US Military Academy, professor at the Naval Postgraduate School (NPS), project director for several major National Science Foundation grants devoted to modeling (including one to initiate a high school modeling contest, the HiMCM[®]), and co-author of a textbook on mathematical modeling that has gone through five editions [Giordano et al. 2013].

References

- Garfunkel, Solomon A. 2021. A very special Doug Faires Lifetime Achievement Award for 2021. *The UMAP Journal* 42 (3) (2021): 185–190.
- Giordano, Frank R., William P. Fox, and Steven B. Horton. 2013. *A First Course in Mathematical Modeling*. 5th ed. Independence, KY: Cengage Learning.

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A Short Story

Eight years ago, my colleague Alfred Cheung of Hong Kong and I conceived of a different kind of modeling contest. The MCM/ICM[®] contests have generated enormous interest in certain countries and regions with a history of work in mathematical modeling education. And so we conceived of the International Mathematical Modeling Challenge (IM²C[®]) as a more Olympiad-styled annual school-level contest that would even the playing field for smaller less-experienced countries.

Each country could put forward up to two teams of up to four students each. The teams would have a significant amount of time to work on one problem and prepare a paper. The problem would be designed by an Expert Panel that would also be responsible for judging the papers. And as with all COMAP contests, there would not be an ordinal ranking, but rather categories: Successful Participant, Honorable Mention, Meritorious, and Outstanding. The entire contest would be overseen by an Organizing Committee.

Not surprisingly, I asked Frank to chair the first Expert Panel. After all, he had spent 15 years as the MCM Contest Director, literally putting the MCM on the map. Our first meeting of all members of both committees was held in Paris to plan the overall contest rules and get everyone on the same page. I couldn't help but notice how much Frank was enjoying himself and how quickly he put his team to work. In particular, I remember the opening meeting of both groups sitting around a large table. After the meeting, Frank and I took a short walk together. He looked at me and he said that he could hardly believe what was happening. On his left was a mathematics educator from mainland China. And on his right was a director of the Kolmogorov special school for STEM education in Moscow. And he marveled at the fact that we were working together to better mathematics education for all students, as opposed to gaming how we might have to fight one another. He was practically beaming. That look of joy and amazement has always stayed with me.

—Solomon A. Garfunkel

Guided by What Frank Would Do

Frank was the 18th Head of the US Military Academy (USMA) Dept. of Mathematics (which assumed that title under his leadership), serving from 1988 until 1995. Whether they ever met him or not, hundreds of Mathematical Sciences faculty and literally tens of thousands of members of the Long Grey Line are indebted to this man. He was passionate about mathematics, dedicated to doing the right thing, and committed to leadership that respects everyone and inspires cooperation, teamwork, and trust. We mathletes owe our culture to him. Though I often fell short, he always was and always will be my role model. Please join me in mourning his passing and in celebrating a well-lived life of dedicated service.

My earliest memory of Frank was from the autumn of 1980, when I was a student in his MA481 Linear Optimization class. He was an army lieutenant colonel with combat experience in Vietnam. His passion for mathematics could not have been more obvious. I recall learning how linear programs could model real-world optimization problems. We also spent a lot of time using the simplex algorithm to solve linear programs. In that era, the entire process was done by hand. The understandable mathematical models, and the way that Frank's absolute passion for the subject burst through what in those days was a very formal classroom setting, convinced me to change my "major" to mathematics.¹

Something quite remarkable happened in Frank's MA481 class later in that semester. One day Frank came to class and told us that we would have a visitor that day and that it was important to him that we be on our best behavior. Visitors were not that unusual. Faculty would often visit each other's classes. We also had other visitors; typically people involved in other aspects of cadets' lives, such as tactical officers. But today the visitor was none other than General of the Army Omar N. Bradley, the famous World War II general². In 1980, Bradley was confined to a wheelchair. He came to class with an entourage of assistants. He looked frail and had a blanket covering his legs. But when Frank explained some of the mathematics that we were learning, General Bradley's eyes lit up. He spoke eloquently for several minutes on how important studying mathematics is to military professionals. He had taught mathematics himself at West Point in the early 1920s and always expressed a fondness for the experience.

¹At that time, the US Military Academy at West Point did not, strictly speaking, have academic majors, but it had been decided to move to a curriculum that offered majors. During the transition we had what was called "areas of concentration," which offered cadets some options in what had previously been a very option-free program of study. I had already changed my area of concentration from chemistry to electrical engineering, and Frank's course had me running to my academic counselor to change again.

²Omar N. Bradley is one of only a handful of American military officers to achieve the five-star rank. He was the last surviving officer to hold that rank when he died in 1981; no five-star generals or admirals have been appointed since then.

I distinctly recall being struck by Frank's reaction to having General Bradley in class for a few minutes. At the time I thought of Frank as a very senior guy. I assumed that he would think of General Bradley's visit as fairly routine and would react that way. Of course, the truth was that Frank had the same esteem for General Bradley that we cadets had for Lieutenant Colonel Giordano. I will always consider it a great privilege to have personally met and talked to Omar Bradley, however briefly.

Unfortunately, I took only that one course from Frank. This may partly be due to that fact that he was on sabbatical to the Naval Postgraduate School for my senior year at West Point (I graduated in 1982), and that was the year when I took several of my mathematics electives.

My next interaction with him was a phone call in 1988. I had applied to join the Dept. of Mathematics at West Point as an active-duty army captain. West Point selects a handful of applicants each year to serve in a three-year "rotating" instructor position. These rotating military faculty cohorts comprise the bulk of each department's instructor strength. Assuming that "Big Army" agrees, individuals selected first spend 18–24 months earning a master's degree (mine was at Georgia Tech). It was a great opportunity, and it was something that I was very keen to do. Knowing that I would be working for Frank is a primary reason for wanting to do this. Frank's phone call in 1988 was to inform me that I had been selected. He could easily have delegated the phone calling to others, but Frank made the calls. I was honored, almost speechless, and thrilled.

I returned to West Point in the summer of 1991 to serve a three-year tour as an instructor. The Department had recently undergone what today would be called a "rebranding": The name had been changed from the Dept. of Mathematics to the Dept. of Mathematical Sciences. Frank was the Dept. Head, the 18th man³ to serve as Head, going back to West Point's founding in 1802. When I arrived, I quickly learned that almost everyone who worked there enjoyed what they were doing and loved working in the department. I also learned that this was not true for some other academic departments at West Point, nor was it true for other people working there in support of "educating, training, and inspiring" cadets. Frank had built a culture in the Dept. that made working there fun and provided an excellent education for our students. That culture thrives today, because of Frank's inspirational leadership, and because the people who came after him recognized that our culture was the secret sauce that made everything else easy. Many hundreds of faculty and staff, as well as tens of thousands of cadets and future army leaders, have benefited from this incredible legacy.

Frank's leadership style was a breath of fresh air and an inspiration. He was involved in our daily activities; teaching alongside us and visiting our classes to help us improve. When talking to others about mathemat-

³At that time, all of the Heads had been men. The current Head, Colonel Tina Hartley is the 23rd Head and the first woman to hold the position.

ics, about the football game on TV last night, or about any other subject, he quickly established himself as a peer. He was a great and insightful listener. Despite his military seniority, he was willing to consider the possibility that he was wrong (but he almost never was). He accepted and underwrote mistakes by subordinates. He empowered us to innovate and experiment with teaching techniques; these included using computers and other technology, as well as what is now called a “flipped” classroom. He created a social culture that everyone looked forward to being a part of, but no one ever felt compelled to participate in any particular event. He was optimistic, he loved mathematics, and he loved his teammates even more. It was a marvelous place to work in every respect, and Frank was the reason why this was true.

In 1994, I left West Point to pursue a Ph.D. at Georgia Tech, with the plan to return to teaching at the Academy upon completion of my degree. Frank retired from his position as Dept. Head and from the US Army shortly after I left, so I did not see him again for many years. Frank worked for Carroll College (Montana) and for the Consortium for Mathematics and its Applications (COMAP) before landing a position at the Naval Postgraduate School (NPS) in Monterey, CA.

Many years later, in late 2004, Frank reached out to me from California. He proposed that I take a sabbatical from West Point to come teach and do research at NPS for the 2005/2006 academic year. After some effort getting the idea approved at West Point, Frank offered to bring me out to NPS to see the place and discuss details with him and with other officials at the school. It was on that trip that Frank did something that I will never forget, and that I think defines his character and his personality.

On that visit, I got off of the plane in Monterey. Frank was there to pick me up and bring me to his home to stay. We shook hands. I started by telling Frank how grateful I was for this opportunity. I called him “Sir,” which in army culture is automatic given that he was a retired Brigadier General and Full Professor at NPS and had been my first Dept. Head at West Point. When I finished, he looked me in the eye and said, “You know that guy who was your professor at West Point and who was your Department Head when you first got back to teach? That was my Dad. I’m your friend and colleague Frank. There’s no reason to call me ‘sir.’”

It was very hard at first to think of Frank as “Frank,” but his disarming smile and warm personality eventually got me to the point of being a little bit comfortable calling him by his first name. But of course I still thought of him as my main mentor and “life coach.” So whenever I wanted to ask for his advice on how to handle something in the Dept. at West Point, or in the army, I would ask Frank what his Dad would do. Frank would play along and offer excellent advice and counsel. Then he would go right back to being Frank.

I also learned that year that Frank treating me well wasn’t an exception, it was his rule: the way that he lived his life. We did lots of things together

that year, whether it was lunch in the Prado Room at NPS, dinner with our wives Judi and Julie, or golf. Wherever we went, Frank treated everyone with respect and dignity, whether it was the guy who emptied the trash at the golf course, a waitress in a restaurant, or someone who had just cut him off on the highway. The world would be a better place if we all tried to be a little bit more like Frank. For my part, thinking “what would Frank do” before making a decision has kept me straight more times than I can count.



Figure 1. Frank and Steve Celebrate Pi Day in Monterey 2016.

After that sabbatical year, I returned to West Point to serve as Deputy Head and eventually Head of the Dept. of Mathematical Sciences. Whenever I could find a reason, I would travel back to the Naval Postgraduate School (NPS): to serve as a Final Judge for the MCM/ICM, to visit with a cohort of future West Point mathematics faculty studying there, or to serve on a review board for the Mathematics Dept. at NPS. But regardless, seeing Frank and Judi was always the highlight of my visit. To say that Frank and Judi were always gracious hosts is the understatement of the century. I will always cherish my time with him.

I will always miss Frank, and I will always be guided by what Frank (and Frank’s Dad) would do.

—Steve Horton

Laughing with Others, Planting Seeds

Among the many talents and attributes that Frank Giordano possessed as a superb leader and caring friend was a remarkable sense of humor. I am not saying Frank was funny—well, maybe he was a little funny. But what I mean is that Frank loved to laugh with others. Sometimes the fun came from a prank that he played on others. My colleagues and I in the West Point Mathematics Dept. were often victims of Frank's pranks—misplaced hats and army paraphernalia, scrambled slides for a briefing, wrong room assignments, and even golf balls found in trees—all sorts of silly situations. Each time, the victims would have that sinking feeling of upcoming disaster for a few seconds, before looking over and seeing Frank's smiling face or hearing him laugh. Then we would all laugh together. One time, he and the Dean had me believing I was being processed for courts martial for violating procurement rules, before my worry turned into a warm handshake for saving cadets money, accompanied by his wonderful smile and laugh.

Frank's greatest gift was planting seeds, in the form of ideas for others to germinate and grow. It seemed like every meeting or encounter with Frank left others with a new idea that just needed some proper care and refinement to become a great result. I know how he loved to smile when he saw the outcome and congratulated the person or group of people who had accomplished the task. Without the seed from Frank, nothing would have happened. As the department head of more than 65 bright, energetic faculty members, evidence of his good idea-planting was everywhere.

Frank was notorious for losing his car keys. One day, he had 65 faculty members searching the department for his car keys. One by one, people returned empty-handed, but soon Frank had the entire department present for an awards ceremony for cadets. There is nothing better than a spontaneous meeting with people laughing together about lost keys—which were never lost and had resided in Frank's desk the entire time.

Frank had many academic interests. He taught modeling courses, wrote books and articles, gave presentations and workshops, and for many years directed, under the auspices of COMAP, the Mathematical Contest in Modeling (MCM). He enjoyed his time as Contest Director, where he organized the problem writing and judging—he was great as director and the contest grew every year. Most important to Frank was that students were learning how to improve the world by learning how to solve real-world problems, understand complex concepts, and work in teams. Between Frank's work in academics and with the MCM, he directly impacted hundreds of thousands of students and faculty; yet Frank's most endearing leadership skill was his one-on-one mentoring, performed equally well in the office or on the golf course. For those of us lucky enough to have had Frank as a mentor, we are forever grateful and blessed.

—Chris Arney

“To the Boards,” Shooting His Age

For those unaware, mathematics classes at West Point are taught in a massive building that was once an equestrian hall, with three windows, all on the east side of the third floor and overlooking the Hudson River. Nearly every classroom is encased by four walls of chalkboards. Back in the day, the Mathematical Sciences Dept. practiced its officer development by having its charges recite their mathematics problems at “the boards”—at the position of attention, using proper chalk colors, straight edges, and pointers. I don’t think it’s a stretch to say that, for the most part, the mathematics classroom experience would have been classified as something other than intellectual development.

Having survived the plebe mathematics hazing, I nonetheless remained somewhat interested in the subject. We didn’t have majors back then but instead “areas of concentration,” and I ended up taking a few mathematics electives. Of those that I took, I was fortunate to be in Frank’s linear optimization class during the fall semester of my senior year (1980). Observations included:

- He must have some clout, because he’s teaching in a room not with just a window, but with *three* windows overlooking the Hudson River.
- (a few weeks later): This guy has serious clout, because the Mathematical Sciences Dept. chose his class for Omar Bradley’s final USMA visit.
- Frank had an enthusiasm and passion for teaching that made for a comfortable learning environment (very much unlike the plebe experience/indoctrination).

Frank had never sent us to the boards until one day in October, about halfway through the term. I remember walking into the classroom and noticing slips of paper on each desk. “Begin work immediately on the following problems”—or something like that. I recall being puzzled, since this was not typical. But when wheelchair-bound General Bradley was brought into the room, it became clear: Frank knew of the general’s imminent visit and wanted to impress him. After a brief introduction, Bradley talked to us about the importance of mathematics in winning the logistics battle of WWII.

During my final semester, Frank graciously led me through a research project, which solidified my admiration for him. That reverence was reinforced as graduation neared, when he invited a few mathematics-related cadets over to his home for dinner. Cadets have notoriously voracious appetites; in response, faculty typically serve tons of burgers, hot dogs, chips, and the like. But not the Giordano family—they treated us to a full Thanksgiving-like turkey dinner. I remember my impression: The Giordanos are special.

A few years after I graduated, Frank had become the Mathematics Chair (aka “P6”), and he invited me to return as an instructor. I would be among a cohort of about 20 who would institute Frank’s new core mathematics curriculum. It was a dynamic, demanding period, that included transforming the department into one dedicated to cadet intellectual development. Frank’s department was family-like, and I was not alone in loving it, mostly because of him.

Two years into this teaching experience, Frank offered me the opportunity to pursue another degree, which led to more than a decade on the Academy faculty. He had departed by the time I returned, and the Dept. was not the same without him. Nonetheless, my family flourished during this period, and for that I will remain forever thankful.

Then, as I transitioned from the army, Frank helped me to join him as a member of NPS faculty. That was a wonderful experience, complemented by many rounds of golf together, including those at Pebble Beach and Cypress Point. I was there when he shot his age at Monterey Pines, and I recall how proud he was to have done it. (I believe that he was four under par after 13 holes when one of the two yahoos who had joined us asked, “What are you, three under?” I replied, “He’s four under, and shut up about it.”) I remember the happiness that he shared with Judi in the lounge afterward.



Figure 2. Frank and wife Judi with golf score card showing him shooting his age.

Another golf-related “forever moment” occurred on Monterey Pines hole 10 when we were playing in a two-person tournament. The format was alternate shot (players alternate taking shots on a single ball), and he didn’t want to hit our tee shot into the water on the right. He hit it way left, leaving me with a difficult shot that had to carry the water, and from an unusual lie. There had been a drought, and the pond level was about two feet below its full line. . . . I hit the ball at its equator, sending off a low, screaming shot that hit the far bank of the pond. The ball rebounded into the exposed bed and came to rest atop the mucky goo. When we arrived at the ball, we exchanged looks, and I said, “Frank, it’s playable.” He was a combat veteran, so this was nothing. . . . He took off his shoes and socks, rolled up his pants legs to just below the knee, waded out with his wedge, sank his feet into the muck, and then hit the ball onto the green—a simply amazing shot. I fully expected to see leeches on his legs when he returned to the grass. . . .



Figure 3. Frank at the 19th hole with Mike Jaye.

Frank was a wonderful man who fulfilled many roles—husband, father, soldier, leader, mentor, scholar, innovator, gentleman, athlete, and friend. He transformed the Mathematical Sciences Dept.—a simply incredible feat when one considers the entrenched positions that he had to overcome; and

generations of cadets, officers, and faculty are better because of him and his legacy. Perhaps most importantly to me, Frank was kind, generous, and humble—uncommon traits for one of his station and accomplishments.

Other than my wife, no one has had a more profound and deeply meaningful influence on my life than Frank. I will remain grateful for all that he did for me, and I know that I am not alone in this regard. I believe that I am qualified to speak on behalf of the generation of officers who served with Frank while he was Chair: we loved him, and we are all thankful that he was a part of our lives. From all of us: Well done, P6! Be thou at peace.

—Michael Jaye

