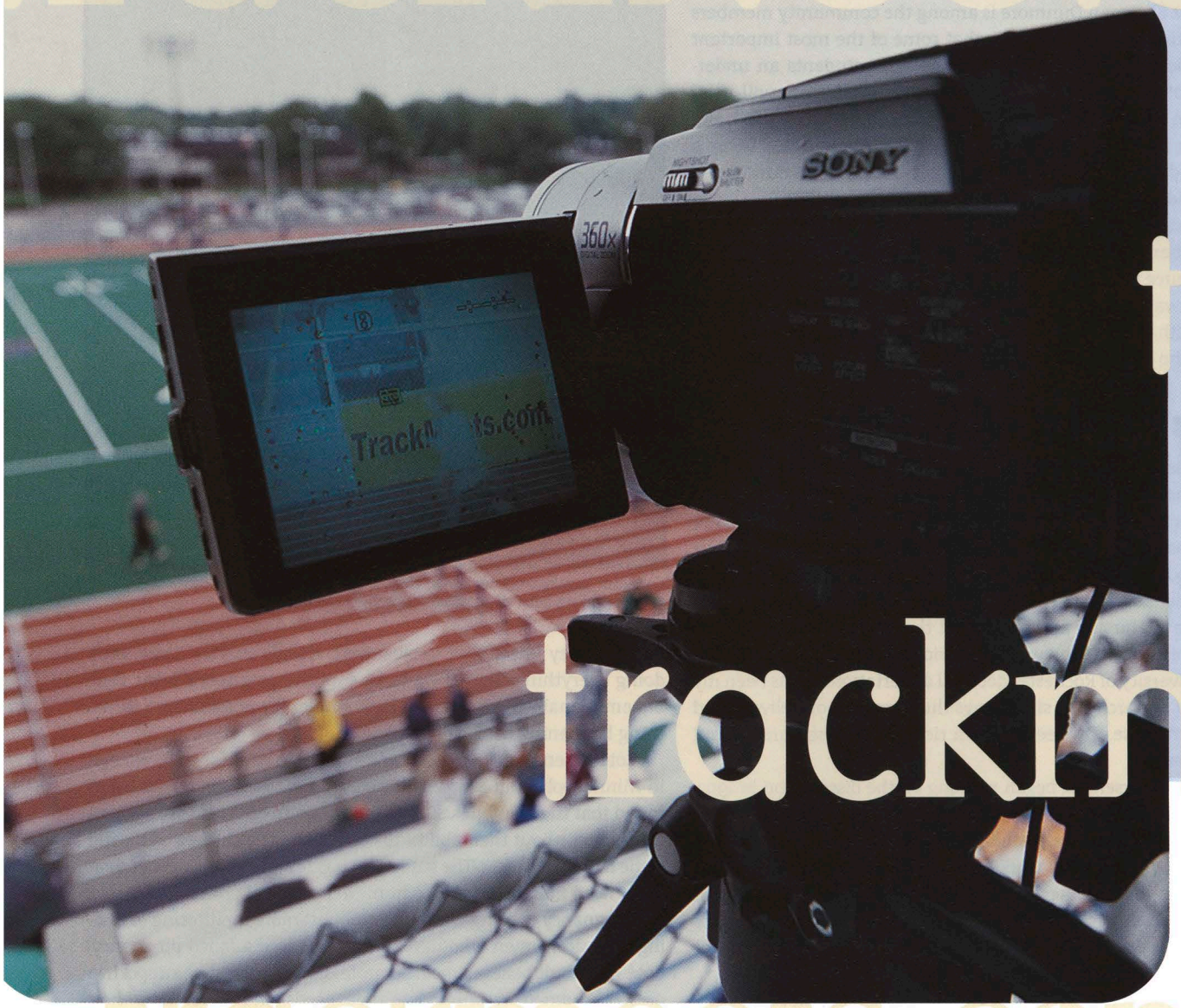

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TrackMeets.com takes off with innovative, television-quality webcasts that give it a wide lead over its closest competitors

By Gary Pallassino

Breaking Away From the Pack

Clad in bright school colors, runners round the bend and head into the backstretch, feet flying over the red rubberized track surface. A camera picks up the leaders, then pans back to follow the progress of the rest of the pack. By the time the lead runners reach the next curve, another camera has them in focus, and the crowd in the stands cheers wildly as the runners enter the homestretch. The neck-and-neck finish is captured by a third camera located across the finish line, and soon the runners' times flash across the screen. It could be a television broadcast, but it's not. The track meet is transmitted live over the World Wide Web, where it can be seen by virtually anyone with a good Internet connection and a browser pointed at the web site of TrackMeets.com, a four-year-old company based at SU's CASE (Computer Applications and Software Engineering) Center.

The company, which specializes in live and on-demand coverage of athletic events, is the brainchild of computer engineering professor Kamal Jabbour. Its student interns—drawn mainly from the S.I. Newhouse School of Public Communications and the L.C. Smith College of Engineering and Computer Science—gain valuable experience directing, producing, and webcasting a range of live and time-delayed events. "This opportunity is not something you'd get anywhere else," says Lauryn Taubman, a junior in Newhouse's Television-Radio-Film Program, who works as a director and producer for TrackMeets.com. "No other company allows interns to produce and direct programs." The company's motto is "Every Lap of Every Race," but in addition to offering webcasts of track meets, footraces, and other amateur and professional sporting events, TrackMeets.com lends its unique technology to business and community applications.

"My dream four years ago was to have a student-created and -run corporation to compete in the real world," says Jabbour, who has taught at SU for 18 years. "What we are doing today, nobody else is doing."

Photography by John Dowling

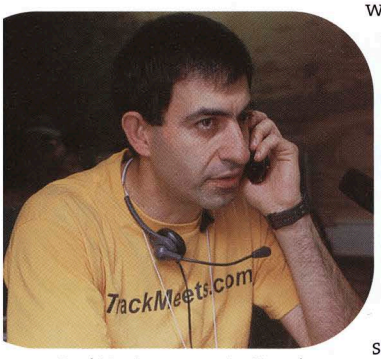
TrackMeets.com crew members begin unloading thousands of feet of cable needed to link camera positions to the company's high-tech trailer, from which its webcasts are produced.

FILLING A HOLE *in Track and Field*

Jabbour, an avid runner for 11 years, is a competitive long distance runner and nationally ranked in his age group as an indoor miler. He serves as a trustee for the Ed Stabler Syracuse Chargers National Distance Running Collection at the Syracuse University Library. He has organized two world-record relays and writes a weekly column on running for The Syracuse Newspapers.

By 1996, Jabbour had become frustrated with the lack of track and running coverage on television. Track and field athletics and footraces attract more than 10 million participants in the United States each year. But as spectator sports, they don't generate the interest traditional media outlets desire. "I decided to do something about it other than complain," Jabbour says. "Computers are my domain, so I decided to start broadcasting track meets on the Internet."

TrackMeets.com was born. Its first webcast, on January 13, 1996, was a far cry from the television-quality video it produces today: Its viewership of eight saw only running text commentary on a meet, sent out live from Manley Field House. But it marked the first live coverage of a track meet on the Internet. "We set up a server, sat down, and typed away for the better part of four hours," Jabbour says. "We were typing the names of athletes in every heat and section, entering results, and describing briefly what was going on in each race." Organizers of the World Track and Field Championships in Seville, Spain, used the same method in summer 1999, Jabbour notes. In 1997, the company's coverage of the Big East Indoor Championships expanded, with the posting of digital pictures of the event as it occurred. "We even had requests from a grandmother in England who wanted to watch her grandson compete," Jabbour says. "We took pictures and posted them so she could see him." By 1998, TrackMeets.com was putting out live audio of entire events, along with two-minute video segments. "All of these were world firsts," says Jabbour.



TrackMeets.com creator Kamal Jabbour monitors his students' work on location at Liverpool High School.

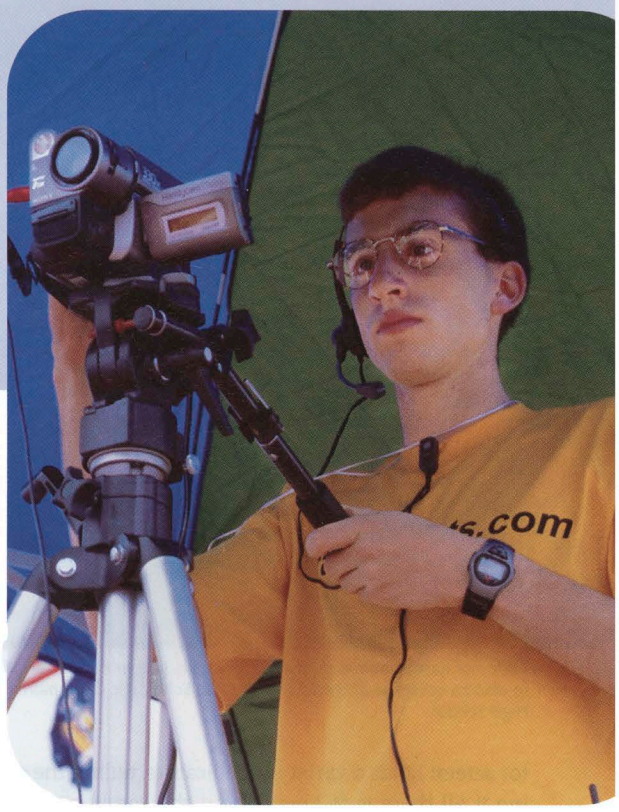
As part of their senior projects, Jabbour's engineering students had been working to push video webcast technology to its limits. They had a major breakthrough on February 27, 1999, when TrackMeets.com broadcast the entire eight-hour New York State High School Indoor Track and Field Championships live from the Carrier Dome. According to *Network Computing* magazine, it was the first athletic event shown live on the web. Viewers saw the event at 20 frames per second in 320- by 240-pixel resolution—about half the resolution of a television broadcast. Computer and information science major Kyeung E. Lee '01, who has managed TrackMeets.com's web site since last September, says the company has accomplished much in its few years of existence. "The most impressive trait is how quickly it has moved forward in technology improvements and in knowledge, learning by experience," she says.

By summer of 1999, Jabbour says, "we knew we had something going for us." He began working on an interdisciplinary initiative with Newhouse television-radio-film professor Michael Schoonmaker. "Kamal was talking about things that we were just as curious about," Schoonmaker says. "In advanced classes, we had toyed with the idea of somehow putting our television production works on the web. But for the first two years, it eluded us. It seemed like it was doable, but there were missing links. It was very technologically complicated. When we consulted alumni and professionals in the field, they seemed as mystified as we were."

The partnership with Jabbour built on the strengths of both schools, Schoonmaker says. The engineer had already mastered streaming video, web content, multimedia programming, and presentation, but needed Schoonmaker's television production expertise for such things as positioning cameras, cutting from shot to shot, and packaging a broadcast. "We taught each other," Schoonmaker says. "Though I have to say he taught me a lot more than I taught him."

"We have given the students, and the entire corporation, the challenge of competing in the real world. We want to define the fourth medium of public communications, and push the technology further."

—Kamal Jabbour
Founder, TrackMeets.com



Above: Patrick Leone III operates a camera above the stands while covering the New York State Scholastic Championships in June. Below, Aline Al Rayes shoots trackside.

Schoonmaker, whose background includes work on the 1988 Seoul Olympic Games, says track meets were the perfect content for exploring the field of web broadcasting. "With content you can actually try out new things, experiment with ways of presenting information in the sports medium, converging different kinds of information, like text and still pictures. With this content focus, we could treat TrackMeets.com as a laboratory to advance our understanding of what the Internet was about and what it could be."

TrackMeets.com now has 40 interns. The company incorporated on January 1, and pays students in stock options. Its board of directors consists of two faculty members, two undergraduate students, two alumni, and one external consultant. "We have given the students, and the entire corporation, the challenge of competing in the real world," Jabbour says. "We want to define the fourth medium of public communications, and push the technology further." Lee echoes the thought, saying the company gives her great personal satisfaction. "I'm using my skills and knowledge to accomplish important tasks, not just for school projects," she says. "It is important for me to maintain a practical, real-world perspective while developing my academic abilities. I'm still learning from my work at TrackMeets.com—I find I learn as much from my work there as I do from my academic studies."

A Day AT THE RACES

TrackMeets.com's June coverage of the New York State Scholastic Championships at Liverpool High School is typical of the company's assignments. A set-up crew arrives the day before the meet with a large trailer—TrackMeets.com's new mobile production studio. Yellow-shirted students run cables to power sources and to various camera positions around the track. "I chose yellow as our corporate color after our first meet," Jabbour says. "I couldn't find any of the interns in the crowd, so I decided to have them wear something I could easily spot."

Having covered a meet here a month earlier, Jabbour and his crew know where to place their four cameras: one atop the grandstand press box, for long shots and pans of the track; another at the starting line that also covers field events when no races are being run; a third at the end of the track to capture finishes; and the fourth for "talent"—students who provide commentary during the races and interview athletes on the field between events. Commentator Rachel Hodgetts, a graduate student at the State University of New York College of Environmental Science and Forestry, works this event. A former high school track athlete, Hodgetts signed on for a TrackMeets.com internship because of the unique experience she would gain. "One of the best things I'm learning is how to act in front of a camera," she says. "I think it will help me later in presenting my ideas, whatever they may be." Hodgetts spends her time off-camera working as an executive assistant to Jabbour. "There are many different tasks that need to be completed," she explains. "Each event is different and has special problems. The new technology they use is fascinating—I'm learning things about the Internet I didn't know, and I'm gaining technical skills I didn't have. It's a really fun job."

Inside the gleaming white trailer, crew members are surrounded by fresh sheets of plywood, new carpeting, and cables that appear to snake everywhere, finally exiting at the rear and side doors. A crew of eight staffs three tables and operates the equipment during the meet. At the first table, a sound engineer and a titler—responsible for adding titles, graphics, and special effects to the webcast—work closely with the director. The second table is for the producer, whom Jabbour calls the "storyteller" of the production. A headset connects the producer to the commentators, to coordinate coverage.

The remaining table contains the heart of the webcast—TrackMeets.com's encoder computer, which sends the live signals out on the web. Its moni-

Professor Kamal Jabbour and crew members gather in the TrackMeets.com trailer to discuss coverage of the New York State Scholastic Championships at Liverpool High School.

"Our interest is in providing the value-added integration of all the media."

—Kamal Jabbour
Founder, TrackMeets.com

tor screen holds a variety of indicators, telling the engineer operating it all there is to know about the condition of the signal, how much memory is being used, and how much the webcast is taxing the processor. The encoder and another computer at the table each sport a model of a fighter jet—a nod to Jabbour's half-time assignment at the Information Directorate of the United States Air Force Research Laboratory at Rome, New York. "Much of the technology we've developed is inside that box," Jabbour says, pointing to the encoder. "It looks like an IBM Aptiva, feels like an IBM, and acts like an IBM. But as soon as we buy a computer, we open it, take several cards out, and put several in. We remove much of the software and put in our own software. Customizing that box has given us the technical edge." An auxiliary power supply ensures that the encoder functions through almost anything.

The day of the meet, Jabbour carefully monitors the indicators. When the monitor mounted at the front of the trailer shows a pack of runners in the homestretch, the computer's central processing unit indicator jumps to 50 percent, and rises dangerously as the signal becomes busy with images of the intense competition. Too high and the machine will crash, ending the live signal and leaving a blank screen where TrackMeets.com's webcast should be. But the runners cross the finish line, and the view immediately switches to another camera while the first camera operator freezes his equipment. The transition may be abrupt, but it quickly sends the computer's CPU indicator plunging back into the safety zone. "That dip saves the machine from crashing," Jabbour says. "Our cameramen are definitely not TV cameramen—the medium defines content for us." He smiles and adds, "This is the reason nobody else can put anything like this on the web."

TESTING *the Limits of Technology*

In April, TrackMeets.com achieved another world first with its television-quality broadcast of the Buffalo (New York) Invitational

from the University of Buffalo. "We went with some trepidation to Buffalo, not knowing whether we would be able to stream video at TV quality," Jabbour says. "Everything went well. That was the last hurdle for us. Now we can settle down, stop pushing the technology from the quality angle, and start pushing it from the content angle." Jabbour notes that on the same day, the Trans America Athletic Conference was broadcasting its track meet live from Troy University in Alabama. "The quality they achieved and the technology they used were basically what we abandoned two-and-a-half years ago," he says. "So we're very comfortable that we have a two-year lead on the rest of the world. Every time that lead narrows, we blow it open again."

Jabbour expects two pieces of technology developed by him and his students to "revolutionize the coverage of running and track and field, not only in this country but around the world." The first is Tandem Multimedia Simulcast (TMS), a technology so original that the editors of *Discover* magazine chose it as a semifinalist in the 2000 *Discover* Magazine Awards for Technological Innovation. "TMS is tandem in terms of the side-by-side multimedia—we have text, pictures, audio, and video," he says. "And we have the ability to broadcast all of these simultaneously." Viewers are presented with a multi-paned screen—the left side contains either live or archived video, as well as such information as runners' names and times. The right side contains a window to the web, along with content from one of the company's sponsors. Jabbour demonstrates the technology with archived footage from a meet at the University of Saskatchewan, Canada. "We synchronized the starter's gun to a stopwatch on every viewer's desktop, so the viewers can take splits of anyone they want," he says, clicking on a particular runner and displaying her time of 12.2 for the first 100 meters of a 200-meter race. "TV cannot give you that. As soon as the race is over, the results come automatically off the computer to everybody's desktop. That's TMS."

The second new technology is Space-Time Abstraction of Computer Information (STACI), which allows viewers to explore an

Randa Jabbour and Rachel Hodgetts provide commentary in the press box overlooking the track and field facility at Liverpool High School.

Director Stacy Kosko oversees TrackMeets.com's production from within the company's trailer, with audio and video feeds from each camera position.

event as it unfolds in time and space. At the USA National 5-kilometer road race championship last June in Columbia, South Carolina, TrackMeets.com had cameras positioned at the starting line and at strategic points along the route. A viewer could click on any one camera to see the race from that perspective, or choose to follow the race along the route at a specific pace, viewing 30-second clips from each camera. Jabbour says any event can be viewed this way. "Take World War II as an example—assuming you have footage of everything that happened during the war," he says. "You decide you want to see everything that happened on December 5, 1942. That's a space cross-section at that one instant in time. Or you may like to see what happened in Normandy during the entire war. That's from the perspective of someone who was fixed in space but traveled in time in the same location. Or you can travel in both space and time and be in the shoes of a soldier of a particular infantry division who traveled through Europe during the war. STACI allows you to integrate time and space into one presentation, and allows viewers to direct what they want to watch."

TrackMeets.com has not sought patent protection for these technologies, relying only on trade secrecy. "My expectation was that, with the pace at which technology is changing in our field, much of this would be obsolete before a patent was issued," Jabbour says. "And the students felt that the immediate rewards of developing technology and keeping us a year-and-a-half to two years ahead of the world were more critical than investing in patent protection."

Jabbour says the company has begun to explore other applications of its technologies. In November, the Public Broadcasting Service (PBS) asked TrackMeets.com to produce a TMS seminar for its *Small Business 2000* program. "The show's producers were so impressed that they hired us to produce all 117 of their shows in TMS so they could be offered as a distance-learning exercise for anybody wanting to learn about small businesses," Jabbour says. Available at *www.smallbusinessschool.com*, the classes consist of a study guide synchronized with video, so that viewers get a transcript of the "big ideas" contained in lectures. Answers to questions in each transcript are kept in a unique database that the viewer can retain upon completing the half-hour class and use to help write a business plan. "Public television provides all the content, using programs it has produced over the last decade," Jabbour says. "We have integrated what was essentially 10 years of very useful programming that was sitting in archives and not being used for anything."

Picking Up THE PACE

TrackMeets.com continues to expand into new areas of coverage, but remains true to its core purpose. A new contract with the converted track and field facility at the 168th Street Armory in New York City adds 85 live meets to the company's webcasts from December through March. "Give me three years and you'll be able to go to TrackMeets.com any day of the week and watch live events," Jabbour says. "Last fall we had 134 hours of live track and field on the web. We were the only company with regularly scheduled web productions. Many TV stations put their signals out on the web as well, in very poor quality. But we had complete productions from the ground up with a camera crew, sound crew, directors, producers, computer engineers, and web engineers." Though TrackMeets.com webcasts have achieved television quality, Jabbour has no interest in seeing them replace the medium. "Our interest is in providing the value-added integration of all the media."

Intern Taubman notes that such competitors as NBC and ESPN have yet to match TrackMeets.com's video quality. "It's hard to believe that here in Syracuse, we're so far ahead of these multibillion-dollar companies," she says. "Go to ESPN's web site and you see a 10-second video clip. And these are the companies that are supposed to be ahead. Dr. Jabbour has pushed himself so far ahead of everyone else, it's hard not to be excited about it and all the possibilities."