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## Frederick N. Scatena: A tropical geomorphologist



**Fig. 1.** This photograph was taken on Fred's last visit to the El Yunque National Forest, which coincided with a visit of the Chief of the Forest Service. Photographed by Jerry Bauer, International Institute of Tropical Forestry, at Puente Roto, Puerto Rico.

Frederick N. Scatena III (1954–2013; Fig. 1) began his career with the Forest Service in 1987 after obtaining his PhD at John Hopkins University (1987) and working with the US Peace Corps in the Dominican Republic from 1977–1979, Malawi in 1982, and Jamaica in 1983. During the 24 short years he spent conducting research in the Luquillo Mountains, Fred dedicated most of his energies to the study of the Bisley Watersheds and made them nationally and internationally known for the research conducted in those humid steeplands. Fred also made fundamental contributions to the conservation of cloud forests and more recently was focusing his work on the Luquillo Critical Zone Observatory, which aimed at understanding the geochemical processes of the Luquillo Mountains. At the University of Pennsylvania, where Fred was Professor and Chair in the Department of Earth and Environmental Science in the School of Arts & Sciences (2002–2013), he also became engaged in Urban Forestry Research.

Being the extraordinary person that he was, Fred Scatena developed a deep relationship between the lands he studied in

Puerto Rico and both their natural and anthropogenic history. Given his assignment to develop a hydrology program at the Institute of Tropical Forestry, now International Institute of Tropical Forestry, Fred set out to understand all the forces that converged in what he called the Bisley Experimental Watersheds. His very first publication on the watersheds is an Institute classic that illustrates his commitment to understanding both the history of the people as well as the land they occupied (Scatena, 1989). The cover of the publication includes images of the discovery of Puerto Rico as well as the many uses of Forest Service lands by the Puerto Rican *jíbaro*. Fred also reached out to and honored other Forest Service employees who made possible the acquisition, description, recovery, rehabilitation, and restoration of the lands initially sold to the Forest Service by the Boyley brothers.

With a clear vision of the historical processes that had shaped the Bisley Experimental Watersheds, Fred laid out a long-term program of research that revolutionized watershed research in the tropics. He established and managed the longest functioning research watershed in the Neotropics and took scientific advantage of the passage of Hurricane Hugo right over the experimental areas. Through his efforts, the Bisley Experimental Watersheds became the premiere tropical site for studying how tropical forests respond to hurricanes, landslides, and other natural and anthropogenic disturbances. Hundreds of scientists visited the watersheds to conduct research. Dozens of students conducted their graduate research there. Fred collaborated with all of them as demonstrated by the 174 co-authors in his publications. His mentorship excellence was recognized in 2007 by the School of Arts & Sciences of the University of Pennsylvania, which awarded Dr. Scatena with the Dean's Award for Mentorship of Undergraduate Research.

Fred applied his research for the benefit of the management of the El Yunque National Forest, of steep and humid tropical lands globally, and the water resources of Puerto Rico and the Caribbean. His contributions to the conservation of cloud forests, tropical rivers, and wet tropical forests attracted national and international attention. A single person became the hub of collaboration with dozens of institutions and hundreds of people. The picture in Fig. 2 shows Fred visiting the Canopy Trimming Experiment plots, an experiment that he helped design.

Beyond all his scientific accomplishments and official persona, Fred was a passionate and warm-hearted individual that touched and influenced many of those who came in contact with him (BOX). Fred projected energy, joy, and hope. His favorite song, *Blowing in the Wind* by Bob Dylan, includes a passage that was

at the heart of Fred's curiosity: *How many years can a mountain exist before it's washed to the sea?* He sought an answer directing a new cadre of scientists through the Luquillo Critical Zone Observatory, which was taking a new look at the Luquillo Mountains through the lens of biogeochemistry. As evidenced by his e-mail message to me on September 29, 2012, Fred was able to extract a partial answer to Dylan's question, at least for the Luquillo Mountains: *They just got the data back on how ... El Yunque rock is eroding...apparently quite fast!*

Quite fast indeed Fred, we lost you too fast...



**Fig. 2.** This photograph was taken in January 2005 when Fred visited the Canopy Trimming Experiment plots. Photographed by Jill Thompson, Institute of Tropical Ecosystem Studies, University of Puerto Rico, at plot B2 (Trim + debris).

### Literature cited

Scatena, F.N., 1989. An introduction to the physiography and history of the Bisley Experimental Watersheds in the Luquillo

Mountains of Puerto Rico. General Technical Report SO-72, USDA FS Southern Forest Experiment Station.

BOX. Quotes printed by the School of Arts and Sciences of the University of Pennsylvania when they celebrated Fred's career in May 14, 2013. The first quote is from a message I sent to the employees of the Institute.

*So, we have lost Fred, our friend and colleague, but let's remember and celebrate his cheerfulness, his dedication to his job, his concern for others, his steady hand, and above all, his openness to people and collaboration; no one was better than Fred at helping others. He could out-scramble just about anyone on the muddy hillslopes of El Yunque and never seemed to bother with things like raingear.* Matthew Larsen, U.S. Geological Survey.

*Fred's passion for helping aspiring young scientists achieve their goals transcended the traditional confines of one's disciplinary focus. Where one might see limitations, Fred saw the potential for interdisciplinary collaboration. I thank Fred for helping me begin a journey in the natural sciences. His legacy will live on.* Jaivime Evaristo, University of Pennsylvania.

*I thank God I met Fred, the intimate, joyful guy delighted with the beauty of nature; not just the world-class scientist.* Juan Felipe Blanco, University of Antioquia, Colombia.

*Fred's consistency and dedication as a mentor was wonderful, and his style had just the right mix of encouraging student independence while offering frequent opportunities to help with the research process. Learning from his example, I aspire to be as dedicated an advisor to my future students as Fred was to me.* Lara Roman, USDA Forest Service.

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