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Obituary for Enrique H. Ruspini

On October 15, 2019, the IEEE Computational Intelligence Society (CIS) lost a great volunteer, Dr. Enrique Ruspini, who devoted a large portion of his professional life to the conception, development and growth of CIS. On the same day, our scientific community lost a great scientist, as Enrique was one of the first pioneers in fuzzy clustering and approximate reasoning, providing a similarity-based interpretation of fuzzy logic. Finally, Bernadette, Piero, and Jim, and many of us lost Enrique, a great friend, who was always ready to help on a moment's notice.

It is difficult to describe Enrique in a few words, and it is even more difficult to separate the volunteer from the scientist.

Enrique H. Ruspini received his degree of *Licenciado en Ciencias Matemáticas* from the University of Buenos Aires, Argentina, and his doctoral degree in System Science from the University of California at Los Angeles. He was one of the earliest contributors to the development of fuzzy set theory and its applications, having introduced its use to the treatment of numerical classification and clustering problems. He also made significant contributions to the understanding of the foundations of fuzzy logic and approximate reasoning methods. His recent research focused on the applications of fuzzy logic techniques to the development of systems for intelligent control of teams of autonomous robots, information retrieval, qualitative description of com-



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plex objects, and knowledge discovery and pattern matching in large databases.

Dr. Ruspini was the author of over 100 original research papers, a Life Fellow of the Institute of Electrical and

Electronics Engineers, a First Fellow of the International Fuzzy Systems Association, a Fulbright Scholar, and an SRI Institute Fellow. He received the Meritorious Service Award of the IEEE Neural Networks Society for leading the transition of the Neural Networks Council into Society status.

Jim still remembers when he was sitting with Enrique on the flight home from the International Congress for Cybernetics and Systems, which was held in Acapulco in 1980. At that time there were no professional organizations dedicated to fuzzy sets and system models, so they decided to form one. Enrique led the way, recruiting Lotfi Zadeh, who then recruited King-Sun Fu, to help us in this endeavor. Without



FIGURE 1 Top Row: Piero Bonissone, Jim Bezdek, Enrique Ruspini; Middle Row: Marc Roubens, Philippe Smets, Janet Efstathiou, Richard Tong, Ronald Yager, Elie Sanchez; Bottom Row: Paul Wang, Abe Mamdani, Tanya Bezdek, King-Sun Fu, Jim Yao, Lorenza Saitta.



FIGURE 2 Enrique receiving the 2018 Frank Rosenblatt award from James Jefferies, Past President of the IEEE.



FIGURE 3 Enrique surrounded by his family after receiving the 2018 IEEE Frank Rosenblatt Award at FUZZ-IEEE 2019, in New Orleans, LA, USA.

Enrique, this would have inevitably happened later, but with Enrique, it happened then. With Jim, Enrique was one of the founding members of the North American Fuzzy Information Processing Society (NAFIPS) and one of the first recipients of that society's King-Sun Fu Award. Figure 1 shows Enrique among some of the 41 participants to NAFIP-1, the first NAFIPS meeting, organized in Logan, UT, by Jim Bezdek.

Dr. Ruspini was also the recipient of the 2009 Fuzzy Systems Pioneer Award of the IEEE Computational Intelligence Society. However, his crowning achievement was the 2018 IEEE Frank Rosenblatt Award, which was bestowed to him “for fundamental contributions to the understanding of fuzzy logic concepts and their applications”. He received this award during the 2019 IEEE International Conference on Fuzzy Systems in New Orleans, LA, in June 2019 (Figure 2), surrounded by his family (Figure 3).

This gave all of us the opportunity to spend a few days with him for the last time. He was very present, as always, he gave a plenary lecture and he participated in a panel. Jim was both humbled and honored when Enrique asked him to push his wheelchair up the ramp to the stage to get the award. Some wondered why he would ask Jim instead of many other possible candidates. There were two reasons: their shared body of work in

fuzzy clustering was a bond for them; but more importantly, they loved each other. That was the last time we all saw Enrique, and it is etched in our memory as one of the best moments of our life.

Dr. Ruspini was a member of the IEEE Board of Directors (Division X Director, 2003–2004), the Past-President (President-2001) of the IEEE Neural Networks Council and its past Vice-president of Conferences. Dr. Ruspini, who has led numerous IEEE technical, educational, and organizational activities, was also a member of the Administrative Committee of the IEEE Computational Intelligence Society and of its Awards and Constitution and Bylaws Committees, as well as its Vice-President for Finance from 2013 to 2018.

However, the description of his accomplishments as a volunteer and as a scientist fails to capture Enrique's passion for life, his outgoing personality, and his breadth and depth of scientific and cultural knowledge. We have known Enrique since the late 70's and we have enjoyed his friendship ever since. Needless to say, we have numerous anecdotes on Enrique's character and personality that we would like to share with you. For the sake of brevity, we will each describe one.

Sharing with Enrique a common interest in soccer and wine, Piero can still vividly remember the day when Italy was playing against Argentina in the 1990 World Cup Semifinals. Enrique and Piero

were in Paris, attending the 1990 International Conference on Information Processing and Management of Uncertainty in Knowledge-Based Systems (IPMU), which was organized by Bernadette. We decided to take a break from the conference to watch the game in Piero's room, which had a large-screen TV. We were obviously rooting for our respective teams but we also behaved with civility toward each other. After a tied game (1-1) at the end of regulation time, Argentina ended up winning 4-3, on penalty kicks – well Argentina had Maradona and Italy did not... Enrique was torn by two opposing feelings: the joy of witnessing the victory of his team and the sorrow of watching Piero sad and distressed (yes, soccer could be an emotionally moving sport). He called room service and ordered a bottle of Chardonnay, which they consumed together, discussing some of the salient points of the soccer game and of course both complaining about the referee... It was typical vintage Enrique.

Piero was not the only one to share the passion for soccer with Enrique. Jim and Enrique had a long and heated set of exchanges about the US soccer team during the 2002 World Cup. This was the only time the US team ever rose to the quarterfinals, but Enrique refused to accept the US team as a legitimate

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in their paper titled “Artificial Intelligence Enabled Internet of Things: Network Architecture and Spectrum Access.” To facilitate IoT users to choose transmission parameters efficiently, several deep reinforcement learning-based approaches are introduced and discussed.

We sincerely thank all of the authors who submitted their papers to our special issue, and to a large number of distinguished reviewers who volunteered their time and expertise and helped us in curating a high-quality special issue on this important and timely topic. We

would also like to thank Prof. Hisao Ishibuchi, the former Editor-in-Chief of IEEE Computational Intelligence Magazine (IEEE CIM), and all the members of the editorial team for their support during the editing process of this special issue.



In Memoriam (continued from page 18)



FIGURE 4 Workshop on Fuzzy Logic, Blanes, Spain, 1989. From left to right: R. Felix, D. Dubois, B. Bouchon-Meunier, L.A. Zadeh, F. Esteva, J.L. Castro, J. Aguilar, E. Bonet, C. Freksa, A. Vila, R. Lopez de Mantaras, L. Valverde, C. Alsina, E. Trillas, J.L. Verdegay, J. Jacas, H. Prade, E. Ruspini, and colleagues.

contender because the US team “didn’t have a soccer history”. And so, they argued... Soccer was a passion we all shared.

Bernadette still remembers his energy and dynamism when participating in the first meetings gathering the emerging fuzzy community. The most surprising for her was probably to see him in Acapulco, where they were participating in the International Congress on Applied Systems Research and Cybernetics in December 1980. After the sessions, a small group went to the beach and Enrique disappeared

at some point, to suddenly appear again, but in the sky, doing some sort of parasailing. They could not believe what they saw!

He was a strong supporter of brand new fuzzy conferences (Figure 4). Bernadette cannot forget that he actively participated in the first issue of the IPMU conference in Paris in 1986 and he continued to attend it regularly during many years, giving for instance a plenary lecture at IPMU 2008 in Málaga, Spain. He was also a plenary lecturer at the first edition of the French

annual fuzzy conference, *Rencontres Francophones sur la Logique Floue et ses Applications*, held in Paris in 1995, which he attended in spite of a general strike in France that eliminated all means of transportation.

Enrique loved computers, travel, astronomy, photography, history, music, opera, and sports. He loved science and people. He was the corporate memory for IEEE CIS, he was a mentor and a friend. We will miss him.

