Executive Summary

I have been an associate professor since September 2012. During these years, I have continued to pursue my goals of excellence, just like I had before being granted tenure. I continued to embrace UTEP's mission, Access and Excellence, pursuing a research agenda of quality, as demonstrated by publications and funding level, and engaging students in research and in community building to enhance recruitment and retention in our computer science program.

Specifically, I have developed and deepened a research program focused on optimization and uncertainty quantification (research funded by ARL through the Army High-Performance Computing Research Center at Stanford since April 2013 – $1,184,000). I have also contributed to my research community by organizing and chairing several international events (including the Annual International Meeting of the North American Fuzzy Information Processing Society – 2011 and 2016). I have developed my activities aimed to enhance recruitment and retention of students in our computer science department, for instance by creating an ACM-W chapter at UTEP, by leading the NCWIT AiC El Paso affiliate, by designing computer science summer camps, and by hosting high-school students as research interns in summer. I have also been involved in projects that aim at understanding the challenges faced by latinas in engineering (NSF Research on Gender – $524,900), and enhancing the retention of our majority-minority students in computer science (NSF IUSE/PFE RED – $4,992,592).

☐ Teaching

Since 2012, I have taught a number of classes: mostly undergraduate-level courses because of the need to cover a list of required courses and to give way to junior colleagues to teach graduate courses. Most of my teaching has consisted of the following two undergraduate courses: Introduction to Computer Science (a.k.a. CS1, taught every semester since Spring 2015) and Automata, but I also created two new courses on Problem-Solving (one 3-credit-hour course cross-listed for undergrad and graduate students, one 1-credit-hour course only for undergrads). The 1-credit-hour course development is a project in collaboration with Google. The idea is the result of working with the CS department's curriculum committee within our NSF IUSE/PFE RED project to offer more options to CS students as early as when they are in their first semester to enhance their motivation in the program while strengthening their essential problem-solving skills. These two new problem-solving courses emerged from an extra-curricular initiative I offered to students taking our intro to computer science course: a 1-hour weekly problem-solving club, which proved to be very effective in developing our students' awareness of their already existing abilities and equip them with more problem-solving techniques.

Mentoring is also a key part of my teaching activities. I consistently have at least 5 undergraduate students conducting research with me (CR2G, see: cr2g.constraintsolving.com). I regularly give independent study projects as another way to mentor students closely. I advise the ACM-W chapter at UTEP. I advise several groups of high-school students in town and I regularly give talks to the community about computer science to better inform then about the field.

☐ Research

My passion is to design approaches to solving problems with uncertainty in such a way that, despite the challenge of having uncertainty, guaranteed decisions can be made. And one area that I like particularly is that of predictions: Can we figure out how a phenomenon is going to unfold? Can we predict how experts would rate a particular system? The core of the research I have conducted over the past five years has been in optimization and uncertainty quantification: for this, I have used many different techniques, from interval computations to fuzzy computing, constraint solving, stochastic approaches, etc. The target classes of problems I have attacked are multi-expert multi-criteria decision making problems and dynamic systems, all of which with uncertainty.

My work has been funded through three main sources: NSF (a CAREER grant project whose half lifetime was executed during the last 5 years – about $560K), AAAS (for my international collaboration with Perugia in Italy – about $19K), and ARL (for my work on dynamic systems via the Army High-Performance Computing Research Center at Stanford – about $1M). In addition, I have made efforts to acquire funding, submitting 20 proposals in total over these 5 years, 8 of which were funded, 6 with researchers from outside UTEP, 3 of which for international projects. Publishing my work has been a priority: I have published in peer-reviewed conference proceedings (19), in books as chapters (17), and in journals (12); I also participated and contributed abstracts and/or short papers in workshops. I have been invited to give a plenary talk in an international conference on guaranteed computing SCAN'16 in Uppsala, Sweden) and to give a seminar talk at the University of Paris Pierre and Marie Curie (in September 2017). I was a visiting professor in Perugia, Italy, working with Dr. S. Bistarelli 4 times during the last 5 years (for a total of about 1.5 month). I indeed value collaboration above all. Internationally, my work with the University of Perugia has resulted in an MOU between UTEP and Perugia, allowing for more exchanges, including of students, and we are working on finalizing a curriculum exchange program. Locally also, my interdisciplinary collaborations have resulted in joint papers with researcher from departments of mathematics, biological sciences, geological sciences, and education, to name a few. I always involved students in my work to catch any opportunity to train them and to teach them team-working first hand.

☐ Service

While at <u>UTEP</u> (the last 14 years), I have consistently served on committees, ranging from departmental to university-level committees. My involvement as chair of the the Women's Advisory Council to the President (WAC until 2016) followed by my participation in the Executive Council of the Faculty Senate (and a few of its committees) gave me a better idea of the university governance and the opportunities for impact. In addition, my involvement in my <u>research community</u> has been at many varied levels: reviewer or program committee member for journals and many conferences, member of several NSF panels, conference chair, organizer of a number of conferences and workshops. Finally, I value serving the <u>local community</u> and both implementing the access and excellence mission of UTEP and encouraging women to pursue computing careers. To this end, over the last few years, I have strengthened my leadership in activities that contribute to better informing and providing opportunities for female and URM students to participate in Computer Science activities. In addition to a number of events in high-schools, at career fairs, science fairs, formal presentations, I have led the El Paso NCWIT Aspirations in Computing program (growing its participation twofold), I created UTEP's ACM-W chapter (guiding them through their success-

ful submission of grant proposals to NCWIT and Google twice), I designed a computer science summer camp that started in summer 2015 and is still in use (allowing to reach out to more than 200 students each summer). Since 2010, I have invited high-school students to intern in my lab in summer and I have to date welcome about 20 of them, mostly young women.

Overall, over the past 5 years, I have confirmed the potential of my research by establishing a well-funded and published agenda, allowing me to contribute to my research community, but also to train many students, at all levels but most of them undergraduates. I have contributed to major redesigns in the curriculum of UTEP's computer science department as well as to changes in the pedagogy of one of its core courses (the introduction to computer science). I have also paid close attention to significantly serving my communities (UTEP, my research community, and the local El Paso community).