Tenure, or No Tenure, That is the Question:

(Taken from: http://oooshebop.wordpress.com)

Tenure, or not tenure, that is the question:

Whether 'tis Nobler in the mind to suffer
The Slings and Arrows of outrageous Fortune,
Or to take Arms against a Sea of troubles,
And by opposing end them: to die, to sleep
No more; and by a sleep, to say we end
The Heart-ache, and the thousand Natural shocks
That Flesh is heir to? 'Tis a consummation
Devoutly to be wished. To die, to sleep,
To sleep, perchance to Dream…

Dr. Castaño's Group Report:

Another academic year, and this one takes us to "tenure time". For those not familiar with academic life, tenure is the decision that comes after 6 years of trial period for professors on "tenure-track". Normally professors have a long trial period of 6 years, after 6 years your boss (school) has to determine if they like to keep you around or let you go. For that, committees are appointed at the departmental and campus level to evaluate your performance. Your performance includes things like: how many MS and PhD students graduated, how many peer-review papers were published, how much research grants were obtained, how many courses taught, how much service was provided, etc. Suffice to say that my usual 2 pages resume stands now at 16 pages long.

In this 5 years, with my students and collaborators, I have published 13 papers (1 more under evaluation) in 4 different research areas, 2 invited book chapters, and some 20 technical presentations including an invited talk. 6 students obtained their MS degrees and 3 are in the pipeline for PhD degrees. The grants for which I was the PI amount to $349,447, with a substantial contribution to other grants obtained by the department that not always bear my name (such is life). My CET scores have improved from 2.5 when I first came to the department to an average of 3.2 in the last 3 years. I wish it were 4.0, but my teaching is still a work in progress. I have taught 9 different courses (NE-25, 105, 205, 300, 301, 304, 308, 341, and 390), and of course serve in many capabilities including campus committees. One of the reasons to be a professor rather than work for industry is the opportunity for self-directed learning. Taking advantage of this I have attended 22 workshops, summer schools, user's weeks, tours, and other seminars and exhibitions, many of which I reported in the Newstron in previous years.

It has been a great ride, and at this time of recollection, I am happy of all things that I have done in this past 5.5 years. It is true that more could have been done, and sometimes the "slings and arrows of outrageous fortune" did fall in my court. In the past 5.5 years I have sent 57 applications or pre-applications for grants

(including grants sent with my colleagues), but in these times of ever shrinking research budgets our department is anyway a winner. 6 years ago, we had one grant worth about $100,000, and 4 or 5 faculty (unstable retention of new faculty). Since those difficult days, we have raised $5.5 million, and now have a pretty stable 7 faculty program. Our biggest benefactor has been the Nuclear Regulatory Commission (NRC) and the Department of Energy (DOE). NRC support for startup packages of junior faculty have made a big difference to all our new faculty and will make also a big impact in the new professor we are looking for. DOE support has helped us increase the quality of our equipment and facilities to our ever growing population of undergraduates.

Our Program has grown from less than 100 students 10 years ago to more than 200 right now. During my time here, we have created a lab on radiochemistry, a neutron generator, an internet accessible hot cell, and we have plans to physically expand our nuclear reactor (double the working area), increase its power (I dream of megawatts), bring a gamma irradiation facility to campus, and a ion accelerator for material studies.

As always I want to recognize and congratulate my collaborators and students (graduate and undergraduate) for their fundamental contribution to my success, without them I could do very little indeed.

Prof. Henry Colorado: just finished his PhD in Materials Science at UCLA with Prof Jenn-Ming Yang. He is back in Colombia working as professor of the University of Antioquia. We will continue our cooperation working in new ceramic composite materials for structural and shielding applications that can resist fire and shock conditions possibly to be encountered in transportation accidents.

Hazim H. Abdulkadhum: I am PhD student from the Mechanical Engineering Department, College of Engineering at Baghdad University, in Baghdad-Iraq. I arrived to MST in April 2013 as a scholar visitor for six months to execute my experiments in a Friction stir welding of dissimilar Al alloys as a part of my PhD research, my advisor is Dr. Joseph Newkirk (Material science and engineering department) who invited me to come to MST as well as granted a full support during my stay. I also arranged with Dr. Castano who facilitated the use of the FSW machine which is located in a Nuclear Engineering Department. He is very cooperative and supported me by providing the possibility to execute my experiments conducive to my research.

Chrystian M. Posada: I can see changes are coming on the horizon. For the last several years I have been climbing this mountain called "PhD". My way up to the top has been an enriching experience, with many journeys along the way, but the summit is soon approaching. My PhD work on the design of a novel Field Emitter Array (FEA) to be used as electron source in a Flat Panel X-ray source is about to be completed. I am currently finishing the fabrication of a second generation FEA in collaboration with Argonne National Laboratory. Once this work is complete we will be the first research team in the world to have designed and fabricated a double gated planarized ultrananocrystalline diamond film (UNCD) based field emitter array. Exciting! In summary, it has been a year to tie up loose ends. So, if everything goes to plan, this should be my last update to you. By the way, now that I am close to the summit I hope I do not slip and fall once I get there, and if I do, I hope my parachute works.

Jessika Rojas: We have been studying hydrogen as an alternative source of energy (a project funded by the U of Missouri Research Board). During my master I worked on the synthesis and deposition of palladium nanoparticles on carbon nanotubes using gamma irradiation for hydrogen storage purposes, and also in the synthesis of nickel nanoparticles. The results have been presented in several conferences, TMS, MS&T, MO Nanofrontiers. Additionally, we wrote a chapter for the book ***Radiation Synthesis of Materials and Compounds***, Taylor & Francis Group, to be released in early 2013. This area opened to me several options of research using radiation chemistry for the synthesis of some other type of nanoparticles with medical applications (Au, Re, Y). Thus, for my Ph.D., I am focusing on the synthesis of radioactive nanoparticles for cancer imaging and treatment using the same approach. Gamma radiation has the advantage of simple physicochemical conditions that lead to homogeneous reduction and nucleation of the metallic nanoparticles. Currently I am doing an internship in ORNL to develop and characterize new radioactive nanoparticles for cancer treatment.

Ahmed Haidyrah: I am an sponsored student from King Abdul-Aziz University for Science and Technology in Saudi Arabia and I am pursing a PhD at the Nuclear Engineering Program. My master's degree research was focused on modeling of membrane fouling and flux decline in Reverse Osmosis (RO) desalination plants and my current interest research is to evaluate the suitably of a bending fatigue technique. This technique is used to determine the capability of the nuclear material to resist cracks and other mechanical failures due to repeated use and strains. Because of limited space in nuclear test reactors (such as ATR) to irradiate full size fatigue specimens in sufficient quantities. The mini-specimens of special shapes are called "Krause specimens". We plan to use Stainless steel 304L, 316L, HT-9 and oxide dispersion strengthen (ODS) steels address irradiation issues in nuclear materials. A new bending fatigue machine was created for mini-specimens to study the fatigue by repeatedly bending the specimens slightly until they fails. I have begun testing stainless steel 304L to test the technique. I have used ABAQUS simulation to determine the maximum stress for its deflection. My next step will be analyzing the fatigued specimens' data in terms of cycles to failure.

Mohammed Alsubhi: I'm a graduate student. I work at King Abulaziz City for Science and Technology (KACS) as a nuclear researcher. They sent me to Argentina (San Carlos de Bariloche) to study at the Balseiro Institute for Nuclear Research and also for training at the INVAP Company (Nuclear Company in Argentina) for 16 months. Dr. Castano has been my advisor since I started the master degree program. I like it here since he is very encouraging and helpful. My topic is investigating the Power Uprating of the of the Missouri S&T Research Reactor from 200 KW to 1 MW.

Daniel Watson: I have been working for Dr. Castaño for just under a year now, in Nuclear Materials Corrosion (a new learning module being implemented in NE341: Nuclear Materials funded by the NRC). We are designing a new set of lab practices that will help future nuclear engineers understand the importance of corrosion. Corrosion is of major importance to nuclear engineers, as we need our materials to maintain their properties within safety margins. When you have a pressure vessel filled to the brim with radioactive materials, you want it to stay sealed at all times, right? People who are new to research have to experience a "learning curve" before they understand just how to conduct research. Thankfully, I'm almost done with that learning curve. Being a Technical Research Assistant for Dr. Castaño has given me priceless experience in research that I feel will assist me well in my future studies and work.

Chandler Mills: I am in my senior year in the nuclear engineering program at S & T. During my studies, I came to realize that I enjoyed math and the scientific approach. The application of these principals in the real world provided the needed catalyst to seek an in depth understanding of engineering principals. I was afforded the opportunity to become involved in research under Dr. Castano with the Nuclear Engineering Department in the Fall of 2012. The team quickly became aware of the complexities involved in creating corrosion experiments. These experiments represent scenarios that may be encountered in the real world. During my time working on research, our team was responsible for developing experiments and preparing research opportunities for other students. These experiments will be used to teach other Nuclear Engineering students the effects of different types of corrosion they might encounter in the nuclear field.

Ian McGhee: I went on Co-op my second semester of my junior year in NE, so I was unable to work on the NRC corrosion project as much as my fellow colleagues, however, Daniel Watson and I worked on testing and writing up an iron nail corrosion lab for NE materials students. We used a 1M Copper (II) Chloride solution in the testing of corrosion in the iron nails. Basically we quantitatively measured the mass difference that occurred through corrosion and wrote up a procedure and questions reflecting that experiment.

Steven Wessels: I began attending Missouri S&T back in the fall of 2011. I had Dr. Castano for my introductory NE-25 course. His energetic presentation of the material further solidified my decision to pursue nuclear engineering. Upon completion of a co-op with Wolf Creek Nuclear Operating Corporation, I decided to pursue a career in research. Dr. Castano offered me an undergraduate position in the area of materials research. I will be researching Zirconium diboride and ionizing radiation impact on it. If my research experience goes well, I will remain at Missouri S&T for graduate school.

Steven Anderson: I am a senior in nuclear engineering at MS&T. I have been working with Dr. Castano since May of 2013. We have been working on an expirement that involves neutron capture by Bismuth-209 for the production of Polonium-210. The polonium-210 will then be chemically seperated using solvent extraction processes. Once the polonium-210 has been seperated, alpha spectrometry will be done to verify the produced polonium. Our goal is to stay well within the NRC exempt activity of Polonium-210. My job is to write a set of procedures that we can use in the future to actually carry out the expirement. This involves calculating activites of different isotopes in the relevant decay chain. Hopefully the research we have done will continue to be built upon in the future by the younger classes of nuclears engineers.