

Mohammad Nazari, PhD

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Dear Ms./Mr.,

I am writing this cover letter to express my interest in the faculty position in Physics department at Texas Tech University (TTU), which matches my professional background, teaching and research experiences. Working at TTU requires individuals who are hardworking, knowledgeable, talented and experienced. Having years of experience in research-oriented environment, teaching different courses of physics in both undergraduate and graduate level, and supervising undergraduate/graduate students, supported by good knowledge and understanding of physics, material-science and condensed matter, I believe, I am qualified for holding this position.

My research interests lie in the experimentally studying condensed matter physics, material science and devices. This research area primarily includes studying optical, electrical and structural properties of functional oxides, phase transition in correlated materials, two-dimensional materials and systems, Terahertz science and technology, nano-materials, semiconductors, meta-material, diamond and diamond like carbon (DLC) films and their applications, solid state lighting, heterostructure field effect transistors (HFETs) and so on.

I have been exposed to research and teaching environment when I joined physics department at Sharif University of Technology (SUT) for master program. SUT is the best technical university in Iran, therefore the program provided me an excellent opportunity to interact with high profile professors as well as talented and smart undergraduate and graduate students. There, I participated in building hot-filament chemical vapor deposition (HFCVD) and CVD tube for growing carbon nanotubes (CNTs). I used HFCVD to deposit diamond like carbon (DLC) films for my master thesis where effect of applied voltage between filament and substrate was studied. Fourier Transform Infrared (FTIR) and X-ray Photoelectron Spectroscopy (XPS) techniques are used to characterize deposited films. I also collaborated with carbon nanotube group, searching for a novel, cheap and efficient way for growing CNTs. During this period, I had the opportunity to teach undergraduate courses and laboratories in physics for the most talented and smart students in the country. Teaching these students have provided me very nice and unique experience regarding teaching in a high rank university.

After finishing my master, I have worked for two years in physics department at SUT as a lab manager. When I took over the lab, it was not in use for quite some time. Therefore, I had to make it ready for coming semesters. To do so, I had to check all the measurement set-ups to see if they are functional and fix some tools, modify, add and some measurement set-ups and write manual for them. During this period, I had the opportunity to mentor and supervise couple of master students to start their projects in the DLC and CNT groups.

In the PhD program, I continued research in experimental physics and material science in Dr. Mark Holtz group in the Physics Department and Nano Tech Center at Texas Tech University (TTU). At TTU, I gained much more experience related to material fabrication and characterization with more emphasis on micro-Raman technique, spectroscopic ellipsometry, photoluminescence, etc. My PhD project was focused on vanadium dioxide, VO_2 , which undergoes thermally driven insulator-metal phase transition at 68 °C with significant changes in electrical and optical properties of the material. In the PhD program, I had also the opportunity to teach different sections of physics laboratories, where I gathered valuable experience and knowledge.

Since PhD graduation, I have been working as a visiting scholar at Texas State University (TxST). At TxST I had an excellent opportunity to participate in an effort to set up Dr. Holtz's optical research Lab. This includes making the lab ready in terms of infrastructures, moving optical tables, pumps, lasers, spectrometers etc. into the lab, setting up, tuning and optimizing different techniques such as visible and ultraviolet micro-Raman, photoluminescence and time-resolved systems. Setting up this research lab provided me with a rare and great opportunity to learn how to set up a research laboratory. Later, I contributed in installing, running, and optimizing HFCVD tool for growing diamond with final goal to be incorporated into high power electronics. As a visiting scholar, I have been involved in various projects including AlGaIn/GaN based heterostructure field effect transistors (HFETs), LiCoO_2 for energy storage purposes, long distance temperature measurement of material based on Raman spectroscopy, CVD grown diamond and incorporation of diamond into HEMT for the purpose of heat management in high power electronics (a project funded by DARPA). The DARPA project includes groups from prestigious and top rank universities in the USA and England, as well as couple of companies and Navy Research Laboratory (NRL). The aim of the project is to utilize high thermal conductivity of diamond film in high power electronic devices for efficient heat management. In the final stage, diamond would be used as a heat dissipator in these devices.

At TxST, I had the opportunity to mentor and supervise students at different level of their study including PhD, master, undergraduate, and high school students. My role was to help them in their projects, train them for different characterization techniques, help them to interpret data and present their results etc. At the same time, I had a chance to present as an invited speaker in physics colloquium at physics department here at TxST. Moreover, since I am one of the expert persons in Raman, I had a chance to teach the Raman section of "material characterization" class offered by Dr. Theodoropoulou.

I would like to express that years of working have provided me valuable experience on how to work on different projects and with diverse people, meet deadlines, interpret, analyze and present data, as well as supervising, mentoring, leadership, management and problem-solving skills. My research background and teaching experience make me prepared to teach and conduct high level research at TTU. Having said these, I firmly believe that I would bring in valuable experiences and knowledge and would contribute to the endeavor toward reaching the set goals and purposes of Physics department at TTU. Therefore, I hope you will find me a qualified applicant for this position.

Sincerely,
Mohammad Nazari