Meet Physics Department Alumnus

Thomas R. Moore, Ph.D.

(Stetson class of 1978)

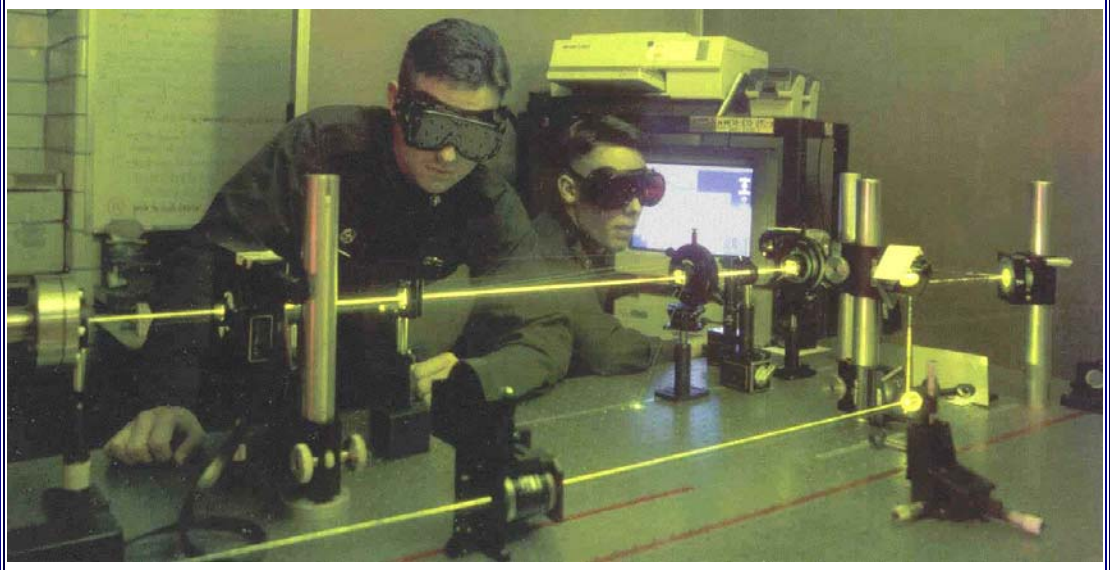
BIOGRAPHICAL NOTES:

Thomas R. Moore received his Bachelors of Science degree from Stetson University, a Masters of Science from the United States Naval Postgraduate School, and his Ph.D. from the Institute of Optics at the University of Rochester. He has recently completed twenty-one years of service in the U.S. Army, during which time he held positions ranging from commander of a combat-arms unit in Europe to Research Associate at Lawrence Livermore National Laboratory. Most recently he held the position of Associate Professor and Research Director in the Department of Physics at the U.S. Military Academy (West Point), where he taught physics and performed research under grants from various governmental organizations. Dr. Moore has published numerous peer-reviewed scientific journal articles, has been awarded a U.S. Patent, and regularly presents his work at national and international scientific conferences. His awards and honors include the Legion of Merit, the Meritorious Service Medal with Oak Leaf Cluster, and the Army Commendation Medal with two Oak Leaf Clusters. He has recently left military service to accept a position in the Department of Physics at Rollins College in Winter Park, Florida. Dr. Moore is married to the former Cathy Perry of Fernandina Beach, Florida and has two children.

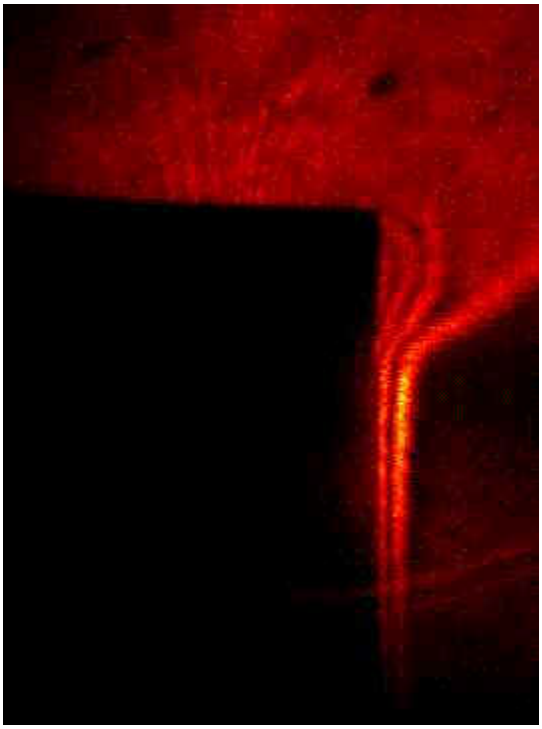
CURRENT RESEARCH:

The majority of Dr. Moore's research has been in the field of nonlinear optics. In the photograph below two of Dr. Moore's students are shown working on an experiment to study a nonlinear process known as stimulated rotational Raman scattering (SRRS). SRRS can be used to study and identify many chemical compounds, and is also useful for changing the wavelength of light coming from high-power lasers. The laser they are using is a high-power solid-state laser with very special characteristics, and was designed and built by Dr. Moore and his students specifically for this experiment. The experiment was designed to determine the effect that laser polarization has on the SRRS process. A report of this work appears in the current

edition of the *Journal of Modern Optics*.

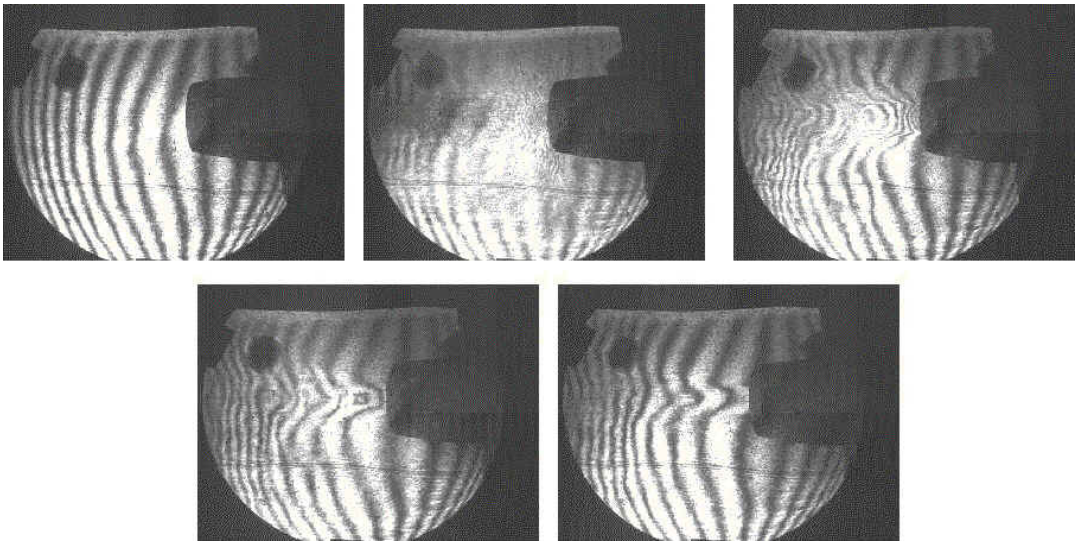


Dr. Moore's recent research has concentrated on using real-time adaptive holographic interferometry to study phase aberrations in the atmosphere. Below is a photograph of the atmospheric distortions around a hot cup of coffee. Note that it is possible to determine the effects of heat flow around the cup by observing the change in the density of the air.

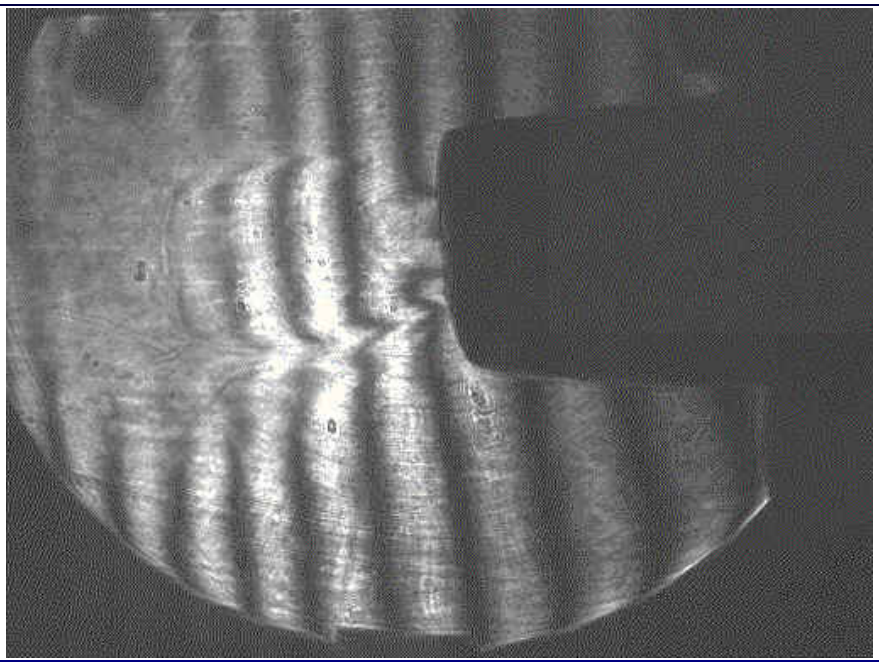


Recently Dr. Moore has been working on methods to remotely detect high speed

projectiles in the atmosphere by the wake they leave behind. The picture below is a series of photographs from an adaptive holographic interferometer showing the effects on the atmosphere of firing a small caliber rifle. The path of the bullet is visible by following the distortion in the lines. The first photograph was taken prior to firing the bullet, and the following photographs were taken in one millisecond time increments.



In order to do remote sensing of the atmosphere using adaptive holographic interferometry, Dr. Moore has developed a single-beam holographic interferometer. This interferometer requires only one beam instead of two, and eliminates the need for an unaberrated reference beam; therefore the source and detector can be located a considerable distance apart. This common path holographic interferometer or *CPHI* allows the observer to detect the gradient of changes in the index of refraction of the atmosphere instead of the actual changes. This makes interpretation of phase phenomena more difficult, but detection easier. The picture below is of the atmosphere near the barrel of a small caliber rifle one millisecond after the bullet has left the barrel. Note that it is easy to see the edge of the wake, but there is little information about the area inside the wake. Compare this picture with the third picture in the previous series to see the difference between the image from adaptive holographic interferometers and a CPHI.



OPEN LETTER TO PHYSICS MAJORS:

To Stetson's physics majors:

It is certainly an honor to be a *featured alum*; however, I must admit up front that I have never viewed my career as being particularly distinguished. I was an average student at Stetson, with more interest than intelligence; but throughout my life I have been very blessed. Below I will give you a brief outline of what my life has been like after Stetson, and hopefully impress upon you what an awesome opportunity you have afforded yourself simply because you are studying physics at Stetson.

When I was at Stetson the physics department had a faculty of three: George Jenkins, Tony Jusick, and Tom Lick. Dr. Jenkins fit our preconceived notion of a physics professor. He was a sincere and caring man who always had our best interests at heart. Dr. Jusick and Dr. Lick (whom we students referred to among ourselves as Tony and TA) were young and caring teachers who were great mentors and friends. (My guess is that the only thing that has changed since then is the "young" part.)

To those of you who are unsure of your future career choice, and who may be concerned about the preparation your Stetson experience

provides, I can assure you that you have no reason to worry. After leaving Stetson, my career in science did not follow the typical course. Indeed, when I left Stetson in 1978 I entered the Army and did not return to science for several years. I spent seven years during the cold war as a combat-arms officer, and during that time I discovered that my background in physics gave me a distinct advantage over my peers. My understanding of science, the ability to think logically, and the habit of relating cause to effect, were important strengths derived directly from my physics background; however, in all honesty, it was the confidence and tenacity gained from late nights of difficult problem sets that really gave me the edge.

After several years I realized that my real interests lay in science, and in pursuit of happiness I entered graduate school. I chose to study at the graduate school run by the U.S. Navy located in Monterey, California. Ostensibly I was studying nuclear physics, but I actually spent most of my efforts learning about lasers and optics, and even spent two months at the Los Alamos National Laboratory doing research in nonlinear optics.

Upon leaving graduate school, I took a position at Lawrence Livermore National Laboratory working in the NOVA laser program. For those of you interested in a career in research I can suggest no better place to work. My experience at Livermore was very positive, and I left there after a couple of years to continue my graduate schooling at the Institute of Optics in Rochester, New York.

I selected the Institute of Optics to continue my study because it is the world's leading optics school. As a native of Florida I can think of no other reason to live in Rochester. The locals claim it is a great place to live because you get to experience "four seasons". My experience was that the four seasons are made up of winter, winter, winter, and road repair season. However, in Rochester I delved deeply into nonlinear optics, and through a circuitous route eventually ended up teaching and doing research at West Point.

Throughout my career I have often reflected on the impact that Stetson has had on my life. My education at Stetson prepared me to become a soldier, a leader, a scientist, and finally a teacher. When it came time for me to leave West Point, my experience and education afforded me many professional opportunities. Positions in government service, corporate research, management, and education were all available to me; these opportunities and more will also be available to you.

While at Stetson I found much of what has sustained me since then (including my wife). The education, mentoring, and opportunities

afforded those of you who have chosen Stetson are unique. You may be assured that upon graduation you will be prepared to meet whatever challenges you choose to undertake. Whether you choose to change fields or continue in physics you will be prepared, and you will be successful.

God Bless,

TRM

June, 1999

Dr. Moore has given us permission to publish his address information, and he would welcome contact from Stetson Physics majors (past, present, or future) or from anyone else.

THOMAS R. MOORE, Ph.D.
Department of Physics
Rollins College
1000 Hoyt Ave.
Winter Park, FL 32789
phone: **(407) 646-2349**
e-mail: ***tmoore@rollins.edu***