

SECTAM XII

The Southeastern Conference On
Theoretical and Applied Mechanics

May 10-11, 1984



VOLUME I
PROCEEDINGS

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SECTAM XII

The Southeastern Conference On
Theoretical and Applied Mechanics

MAY 10-11, 1984

conducted at
Callaway Gardens
Pine Mountain, Georgia



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VOLUME I PROCEEDINGS

Prepared By
ENGINEERING EXTENSION SERVICE
School Of Engineering
Auburn University, AL 36849

TWELFTH SOUTHEASTERN CONFERENCE ON THEORETICAL AND APPLIED MECHANICS

PROCEEDINGS
(Two Volumes)

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FORWARD

Approximately a quarter of a century ago SECTAM was founded by a small group of mechanicians at the Reactor Division of Oak Ridge National Laboratory. Then, and even more so today, there were so many outlets and meetings being conducted that attendance to all of them could seriously interrupt one's continuous research effort. Why, then, was another continuing education conference superimposed on those existing ones? The decision was made largely on the basis of the following thoughts: there were a number of important contributing research laboratories and considerable research talent in the universities in the southeastern region of the United States. Yet there was a sparsity of technical meetings and conferences in this region--a situation not unique to mechanics.

It was the perception of the group that logistical problems prevented many researchers from availing themselves of the opportunities to interchange information with their peers -an interchange so critical to the sustaining of competence and to the achievement of progress in the solving of problems. Also, important problem areas could easily be brought to the attention of this competent research talent. Further, it was obvious, and most important, that the fledgling researchers - the graduate students - could glean many benefits from attending these regional conferences. Inspiration and acquisition of ideas concomitant with attendance at technical meetings dictated that these meetings be accessible and affordable.

The first conference, sponsored by Oak Ridge National Laboratory, was held in the spring of 1962 at Gatlinburg, Tennessee with an attendance not too different from what we expect here in another resort area, Callaway Gardens, Georgia. Thus, SECTAM was successful from the start. Succeeding conferences were sponsored by Georgia Tech, University of South Carolina, Tulane, North Carolina State, University of South Florida, Catholic University, VPI & SU, Vanderbilt, University of Tennessee, and the University of Alabama at Huntsville. The thirteenth conference returns to South Carolina for the twenty-fifth anniversary of its founding.

The founding group intended that the conference not be provincial in participation and subject content. In this respect, this twelfth conference is no different from the first eleven conferences. What is different is the extent of the participation. Prior to SECTAM XI, the By-Laws of the Conference restricted the numbers of papers presented to no more than fifty. With the lifting of this restriction, the growth of the conference has been phenomenal.

We are very pleased with the tremendous response to the Call For Papers as well as the positive replies from authors of invited papers. The papers being presented in this twelfth conference are by authors from forty of the forty-eight contiguous states, ten Canadian universities and nine foreign countries. Research in mechanics is alive and well!

On behalf of the Executive Committee, I wish to extend my sincere gratitude as well as congratulations to all of those who have had a part in bringing this conference to a reality. In particular, I want to thank the staff of the Engineering Extension Service at Auburn University, Dr. Aydeniz Signer in Mechanical Engineering, Dee Barbin, Laura O'Brien and my wife, Estelle, who planned the Spouse's Program, and Ms. Teresa Speir-Reiff who provided secretarial assistance in the early stages of the program development. The results of this extraordinary dedication will long be evidenced by the permanent documentation through the conference PROCEEDINGS and SELECTED PAPERS.

Thank you and best of luck in the future.


Wimfred A. Shaw
Executive Chairman, SECTAM XII

Auburn University

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107 Samford Hall

April 9, 1984

Telephone (205) 826-4650
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Conferees of SECTAM XII
Callaway Gardens, Georgia

Dear Colleagues:

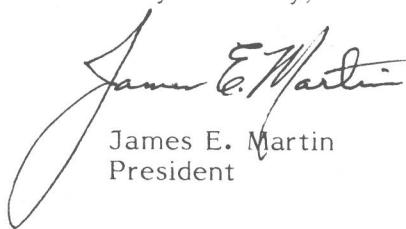
It is with considerable pleasure that I extend welcome greetings to you on the occasion of the twelfth renewal of the Southeastern Conference on Theoretical and Applied Mechanics. Although I have been in my present position at Auburn for just a short time, I can tell you that I know of the excellent peer reputation and impact that have been established by this biennial sharing of developments in the field of Mechanics. The southeastern area of the nation is a fertile source of splendid work in your field, and I congratulate you on this occasion to professionally associate yourselves to further the education of all interested parties.

I am particularly pleased that Auburn University has been chosen to conduct this twelfth conference, especially since two of SECTAM's six "founding fathers" are members of our faculty. One of my goals as president of Auburn University is to encourage more of this peer group activity on our campus. Hopefully in the very near future we will have facilities to adequately and comfortably support such activities.

I am excited about the opportunity of providing the leadership for Auburn University during the next few years. Tremendous potential exists for the strengthening of the teaching, research, and extension programs. Some of this potential can be realized if the very favorable budget recommendation by the Governor is approved by the Legislature.

Best wishes for a highly successful conference, and we look forward to your visiting the campus as often as you have opportunity.

Very sincerely,



James E. Martin
President

fls

Auburn University

Auburn University, Alabama 36849

School of Engineering

Office of the Dean
108 Ramsay Hall

April 6, 1984

Telephone (205) 826 4326
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Participants in SECTAM XII
Callaway Gardens, Georgia

Dear Colleagues:

On behalf of the faculty and staff of the School of Engineering, I extend my best wishes to you for a most successful twelfth conference. I recognize the value of this meeting and the contributions that the various committees, as well as each of you, are making in this Continuing Education event. The breadth, depth and scope of the large number of sessions to be conducted and papers to be presented in SECTAM XII is impressive. This conference will make a major contribution toward the exchange of knowledge among all interested parties.

In this world of rapidly advancing technology, Continuing Education is becoming an essential element in the life of a practicing Engineer. Auburn University is dedicated to providing Continuing Engineering Education opportunities and we are pleased to be a part of SECTAM.

I extend an invitation to each of you to visit our campus. The School of Engineering is in the midst of a thirty million dollar expansion program to meet the increasing demands in teaching, research and public service. We have a number of innovative programs underway which you may find interesting.

I look forward to seeing you on May 10.

Sincerely yours,



Lynn E. Weaver, P.E., Ph.D.
Dean of Engineering

LEW/jh

LOCAL ARRANGEMENTS

It is my pleasure to serve as Secretary-Treasurer of SECTAM XII. Within that responsibility, I have also assumed the duties of Chairman/Local Arrangements. We are very pleased to have had the opportunity to work together with the various committees to stage this conference.

Callaway Gardens, Pine Mountain, Georgia, was chosen to provide an attractive atmosphere conducive to professional association and study with opportunities for relaxation and recreation for the entire family. We think you will find this location to fit that mold very well. Not only does this Center provide the necessary meeting room accommodations, but also delightful surroundings with plenty to do and see when not engaged in technical sessions.

The recreational amenities of Callaway Gardens will be available to SECTAM XII participants and their families. Enjoyable activities include golf (three championship 18 hole courses and an executive 9 hole course), tennis (Plexipave & Rubico), racquetball, horseback riding, fishing and trap and skeet shooting. The Callaway Gardens Inn also has an olympic-sized swimming pool and fitness center. Information regarding recreation and rates will be available at the conference registration desk.

Casual dress is appropriate for all of the conference meetings. Normal temperatures range from the low fifties at night to the high seventies during days at this time of the year.

The entire staff of the Engineering Extension Service, Auburn University, has been assigned to assist you in your requests during the course of this conference. Please allow us to assist you with these requests.

I would like to take this opportunity to extend my welcome to each of you to this conference and to express my personal thanks to everyone who has responded in such a diligent and enthusiastic manner in bringing this conference to fruition.

Best wishes for a successful conference, a relaxing and rewarding visit and a safe trip home.



J. Fred O'Brien
Secretary-Treasurer, SECTAM XII
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