**American Society of Mechanical Engineers - Aerospace Division**
**Adaptive Structures and Material Systems Technical Committee**
at the
ASME International Mechanical
Engineering Conference and Exposition

Tuesday, November 8, 2005
7:30pm - 9:30pm in Europe 7 Room
Walt Disney World Dolphin Hotel

# AGENDA

## 1.0 Attendance and acknowledgment of visitors (Chris Lynch, Chair)

Meeting was convened at 7:35. Chris Lynch welcomed the members and the visitors. Chris Lynch passed around a sign in and visitor sheet.

## 1.0 Review and acceptance of minutes of committee meeting held at the 2006 ASME Meeting, Orlando, FL (Don Leo)

Chris Lynch indicated that Rick Claus was not contacted regarding the SPIE Fellow. The minutes were accepted. Janet Sater had minor changes that were passed to Don Leo in a hard copy.

## 3.0 Membership Report (Don Leo)

### 1.0 Circulation of Roster for Updating

### 2.0 Membership Attendance Report (Don Leo)

Don Leo presented a report on the current and past membership (see attached). Chris Lynch discussed the option of requesting members who have not attended meetings for the last two years to become a 'friend of the committee.'

Chris Lynch then had the members and visitors introduce themselves.

Action: Chris Lynch and Don Leo will draft an email for the non-active members.

## 4.0 Treasury Report (Zoubeida Ounaies)

### Status and update

Zoubeida Ounaies passed around a treasury report (see attached). Zoubeida brought up the question of how to handle food and drink at the TC meetings. Janet raised the question of whether SPIE paid for the food at that meeting. Chris Lynch indicated that they did pay for the food. Chris Lynch brought up the point that we should talk to our sponsors to determine how they would like their money spent. Mary Frecker suggested that we should place the logos of sponsors on our agenda.

### Strategic Plan / Fundraising (Gregory Washington)

Greg Washington went over the draft strategic plan (see attached). Mary Frecker indicated that agenda item 9.3 would address the issue of a 'Young Investigator Award.' Greg Washington suggested that ASME should handle the plaques for all of the awards. Greg indicated that a named endowment would require raising a lump sum of cash, where the draw or the interest on the endowment would fund the committee's needs. Greg indicated that 50 to 75K would be required for this to happen. Members suggested that an endowment of that size for this committee is not unreasonable. Naming rights for awards is one way to raise cash. Sponsoring a workshop is another way to raise funds. Greg recommended that a YI award be added, move the plaques to ASME, and raise the awards to $1000. Chris Lynch indicated that certain sponsors had expressed an interest in supporting student awards as opposed to awards for researchers. Greg suggested that we define the needs and then discuss the funds required to achieve these goals. Chris suggested that we look at the items one by one and then approach sponsors who would be able to choose which items they would like to fund. Zoubeida Ounaies indicated that we need to keep raising funds to maintain our current expenditures. Chris Lynch indicated that our revenues and expenditures were approximately $3000 without food at the meetings.

Greg Washington moved that we vote on the recommendations individually.

Item a) on draft strategic plan – Janet Sater suggested that if the best paper awards were raised to $1000, then the Adaptive Structures prize should be $2500.

Item b) Greg Washington stated that his opinion is that the YI award and the plaques and certificates are the most important items. Mary Frecker agreed with this assessment.

The motion on item a) in the draft strategic plan was put forth by Greg Washington. After discussion the item failed.

The motion on item b) failed.

Item c) Janet Sater moved that the YI award be named the "Gary Anderson Young Investigator Award". The motion was seconded. Mary Frecker indicated that other awards are named in this manner. The motion was passed.

Item c) was voted on and passed.

Greg Washington moved on item d). The motion was seconded. The motion was passed.

The recommendations that were passed were

c. A "Named" best paper award for Younger Researchers ($1000.00). This should be named after one of our pioneers or maybe even our largest sponsor.
d. Plaques and Certificates ($1000.00)

**5.0 Reports on ASME IMECE**

**2005 AMS Symposium: Marcelo Dapino and Mehrdad Ghasemi-Nejhad**

Marcelo Dapino indicated that we had 15 sessions, 64 presentations, and 47 technical publications. Zoubeida Ounaies raised the question on whether the joint sessions were interesting for the future. Mehrdad indicated that he would be interested in continuing.

Mehrdad passed around the call for papers for the 2006 meeting. Mehrdad commented that the March 6 deadline was after the SPIE meeting in 2006.

Mohammed Elahinia volunteered to be a co-chair for the 2008 meeting.

**2006 AMS Symposium: Mehrdad Ghasemi-Nejhad and Arnold Lumsdaine**
**2007 AMS Symposium: Arnold Lumsdaine and Kara Peters**

**6.0 Reports on AIAA SDM**

**2005 Adaptive Structures Conference: Lee Peterson and Steven Griffin**

Lee P. and Steve G. were not present. Diann Brei made an informal presentation on the conference.

Action: Diann Brei will give Don Leo Lee Peterson's email.

**2006 Adaptive Structures Conference: Steven Griffin and D. Ambur**

7.0 Reports on SPIE Symposium

2005 – Chair: Vasundara Varadan, Co-Chair: Yoseph Bar-Cohen
2006 – Chair: Yoseph Bar-Cohen, Co-Chair: Alison Flatau

2007 Chair will be Yosi Bar-Cohen and co-chair will be Alison Flatau.

1.0 Smart Structures & Integrated Systems Conference

2006 - Chair: Yuji Matsuzaki, Co-Chair: Don Leo

Don Leo gave an informal report on the conference. There were 66 papers accepted to the conference symposium.

Mehrdad will co-chair 2008

2007 - Chair: Yuji Matsuzaki, Co-Chair: Don Leo

7.2 Active Materials: Behavior and Mechanics

2006 - Chair: Bill Armstrong, Co-Chair: Marcelo Dapino

87 papers were received. Marcelo will get specific information.

2007 – Chair: Marcelo Dapino, Co-Chair: Zoubeida Ounaies

7.3 Damping and Isolation

2006 – Chair: William Clark, Co-Chair: Mehdi Ahmadian / Arnold Lumsdaine

48 papers were received.

2007 – Chair: William Clark, Co-Chair: Mehdi Ahmadian / Arnold Lumsdaine

2008 - Chair: Mehdi Ahmadian, Co-Chair: Arnold Lumsdaine

**7.4** Industrial and Commercial Applications

2006 – Chair: Ed White, Co-Chair: Porter Davis

No report was available for the symposium.

2007 – Chair: Porter Davis, Co-Chair: ?

2008 – Chair: Porter Davis, Co-Chair: ?

**7.5 Sensors and Smart Structures Technologies for Civil, Mechanical and Aerospace Systems**

2006– Masayoshi (Tomi) Tomizuka and Victor Giurgiutiu and Chung Bang Yun

Victor Giurgiutiu reported on the conference. Two sessions were run in parallel. The conference attendance was increased due to the association with an NSF Grantee's conference as well as high attendance from civil engineers due to a co-chair from South Korea.

The chairs in 2007 will be the same as that in 2006.

**1.0 Best Student Paper competition: Arnold Lumsdaine**

Arnold Lumsdaine reported that there were 21 submissions, down from 49 the previous year. This was attributed to the lack of an email from the SPIE. Arnold L. asked if the database could be used for this purpose. The members of the TC Database agreed. Zoubeida Ounaies has agreed to take over the Best Student Paper competition for the next year.

It was suggested that we advertise to the ASME student section.

**8.0 Reports on International Conference on Adaptive Structures & Technology (ICAST) 2005 Paris, France, Roger Ohayon**

Roger Ohayon presented an overview of the ICAST meeting. There were 110 abstracts submitted; 93 were accepted. The number of the sessions on the last day was doubled. Proceedings will be in book form. The 2007 meeting with the 17-19

October. The 2007 meeting will be organized in Canada. Probably in 2008 in Glasgow; 2009 in Hong Kong.

2006 Taiwan, C.K. Lee

## 9.0 Honorific Subcommittee

### 9.1 ASME Adaptive Structures and Material Systems Prize (Dan Inman)

Chris Lynch announced that the final decision on the prize had not been made yet. The committee will wait for the decision.

### 9.2 Nominations for the ASMS Best Paper Awards (Mary Frecker)

Mary reminded that the chairs from the SPIE meeting should have two nominations from each of their conferences. Mary indicated that no papers had been nominated. Chris Lynch reminded the committee of the importance of providing nominations to the committee. Marcelo reminded the committee that should contact Dan Inman about JIMSS papers of honors quality.

Structures and Structural Dynamics (Norman Wereley)
Materials and Material Systems (Marty Dunn)

9.3 Discussion the ASMS Young Investigator Award (Mary Frecker)

Nominations were incorrect.

Mary Frecker passed around a survey of similar awards from other committees. Diann Brei suggested option B which is similar to the SES award. Greg Washington suggested making it younger than 35.

A vote was taken; it was decided to make the requirements of Option B '7 years of terminal degree'.

A motion was made to keep the name "Young" as currently stated. The motion failed.

A motion was made to make it the 'early achievement award'. The motion passed.

Action: Change the name to "Early Achievement Award" and change the requirements to "must be within 7 years of terminal degree…."

Action: Mary will make a proposal at the 2006 SPIE meeting regarding the details of the award process (done).

ASME Fellow Nomination (Kon-Well Wang)

Kon-Well Wang indicated that we have assembled two nominations for the Fellow Award.

Operating Procedures

TC Database (Diann Brei, Mehrdad Ghasemi-Nejhad, Don Leo, Greg Agnes, Marcelo Dapino)

Vit Babuska is the AIAA Secretary and a member of the database committee.

Action: Add Vit Babuska to the database subcommittee.

AIAA Business (F. Straub)

Diann Brei is the new AIAA TC Chair.

Diann introduced the concept of an electronic newsletter for the Adaptive Structures committees. The newsletter would come out twice a year. ASME would write the newsletter at the end of the year; AIAA would write the newsletter during the summer. There would be a common format to the newsletter. The newsletter would be distributed to the TC websites and to the database.

Chris Lynch questioned the details of the newsletter. Diann suggested that a Newsletter Comm. be developed between the two committees. In the AIAA comm. the secretary will be responsible for putting the newsletter together.

Diann made a motion to make an ad hoc committee for the newsletter comm. The motion was seconded and passed. Marcelo Dapino, Don Leo, and Sergio Lucato volunteered to be part of the ad hoc committee. Don Leo indicated that he would help out as Secretary.

NEW BUSINESS

Chris Lynch passed around "ASMS ASME TC Relationsip with SPIE" (see attached). Chris Lynch suggested that people examine the information and further discussion would occur at the SPIE Meeting.

Action: Include as an agenda item in the 2006 meeting.

Chris ten passed around "Should the ASME … Division" (see attached). He also suggested that people examine the information and further discussion at SPIE.

Action: Include as an agenda item in the 2006 meeting.

Janet Sater stated that Gary Anderson will be retiring this month from ARO. Norman W. suggested that we put together a special issue of JIMSS in honor of Gary.

Nominations for new TC members

Chris Lynch introduced all the nominees that were present.

A motion passed that all of the nominees not present be considered at a later date.

Action: Consider these nominees at the SPIE meeting (done).

| | |
|---|---|
| Wenbin Yu, Utah State University | passed |
| Nakhiah Goulbourne, Virginia Tech | passed |
| James Joo, Univ. of Dayton Research Institute | passed |
| Dan Clingman, Boeing | tabled until SPIE 2006 |
| Michael Fripp, Halliburton | passed |
| Nancy Johnson, General Motors | passed |
| Gangbing Song, Univ. of Houston | tabled until SPIE 2006 |

Adjourn

Meeting was adjourned at 9:55pm.

**Membership Report**
**Presented at the 2005 Adaptive Structures and Material Systems TC Meeting**
**Orlando, FL**

**Purpose:**
Issues of TC size and membership composition have arisen at a number of our meetings. At the 2005 SPIE meeting I was asked to prepare a summary of the TC statistics on membership and a brief history of attendance by members.

**Current TC Statistics**

| | |
|---|---|
| Number of Members: | 56 (including Elio Manes) |
| | |
| Academic | 28 |
| Industry | 11 |
| Government | 16 |
| | |
| United States | 52 |
| Japan | 2 |
| France | 1 |

**Past TC Statistics**

| | |
|---|---|
| Attendance | (Attendees / Number of Members) |
| ASME 2002 | 26 / 48 |
| SPIE 2003 | 25 / 48 |
| ASME 2003 | 22 / 48 |
| SPIE 2004 | data not available |
| ASME 2004 | 20 / 54 |
| SPIE 2005 | 28 / 56 |

Using data from 5 of the 6 previous SPIE and ASME conferences, the attendance of the membership has been

19 people have attended 80 to 100% of the time
18 people have attended 30 to 60% of the time
19 people have attended 0 to 20% of the time (9 – 0%, 10 – 20%)

# ASME Strategic Financial Plan (Draft)

Increasing the revenue of our committee is necessary to complete our mission as a technical committee. Presently we have the following yearly commitments:

Adaptive Structures Prize ($1000.00)
ASME Congress Wine and cheese reception ($1000.00)
SPIE Student paper competition ($0.0)
Best Paper awards (Materials and Structures $1000.00 - total)
Food for Technical Committee meetings ($500.00)
Miscellaneous (Plaques, Certificates etc. $500.00)

Because of the generally esoteric nature of the research we perform there is not a venue where researchers in the adaptive structures arena can get recognized for significant achievement. The best paper awards and the SPIE student paper competition fulfill this mission. We believe it is imperative that we maintain these awards and their monetary dollar values for the foreseeable future. These awards inspire competition and collaboration and allow us to evaluate what achievements are truly significant. We receive the following revenue: ($2K from SPIE) and ~$400.00 from the ASME Aerospace Division (Discontinued after 9/11).

The proposal herein offers both near term (< 3 months) and longer term (9 to 18 months) suggestions by which we can increase our revenues.

## *Recommendation:*

The monetary values for the awards should be upgraded significantly and an additional award for younger faculty should be added.. Here are some preliminary recommendations:

Adaptive Structures Prize ($2500.00)
Best paper awards Materials and Structures ($1000.00 each)
A "Named" best paper award for Younger Researchers ($1000.00). This should be named after one of our pioneers or maybe even our largest sponsor.
Plaques and Certificates ($1000.00)

It is recommended that an **endowment** be raised to pay for our best paper awards and the SPIE money would be used to pay for yearly operating expenditures (food, miscellaneous cost, etc.). This means an endowment capable of providing about ($7000.00) per year is needed.

### ASME Named Endowment

Endowed gifts can be setup in two ways:

(Lifetime Endowment) Only the **income** from the invested contributions is used to support the desired activities. In this case the initial funds are invested in perpetuity and there is a higher threshold for initial investment

(Limited Term Endowment) The **income and part of the principle** are used to support the desired activity. In this case the endowment has a finite lifetime but requires a lower threshold for initial investment. The endowment will thus expire in a finite period say 20 years.

Endowed funds are established for a variety of reasons: to provide scholarships, to honor distinguished careers, to memorialize loved ones or simply to express appreciation to the TC. In most cases the donor's motivation for establishing or contributing to an endowed fund is a desire to permanently enhance the field of smart materials and its programs.

**Investment policy**

A university or the ASME will manage the endowment on a mutual fund basis. The endowed fund will be assigned a number of shares based on the value of gifts to the fund. The value of each share will be calculated monthly using the number of existing shares and the fund's market value at month's end. Monies would then be distributed annually based on a fixed percentage of the average market value per share of the endowment during a fixed period of time. A formula for this distribution will be adopted at a later date but should be consistent with large teaching and research universities.

Because of the nature of the funds distribution a **minimum** initial goal of $50,000 - $75,000 is recommended depending on option chosen.

## *Endowment Fund Raising*

There are a number of ways to raise revenue for the endowment:

### Solution 1. ASME TC Members

Before funds are solicited from the outside an internal drive could be initiated. TC members could pay a "voluntary" one-time endowment fee of between $1000.00 - $1500.00. The goal would be to raise 30% - 50% of our required goal. When future members joined the TC they could be asked for the fee as well. In exchange for the fee members could get lifetime membership in the TC (Lifetime Endowment) or limited term membership (Limited Term Endowment).

### Solution 2. Corporate Sponsorships

A number of companies have benefited tremendously from advances in smart materials and related technology. In many cases the technology had its origins in this technical committee (TC). In addition there are program managers who are part of this TC who may be able to creatively get a large sum of money to the TC (perhaps through a workshop or conference). Sponsoring companies will receive recognition at TC events and any publications and written correspondence of the committee.

There are two forms of sponsorships:

***Major Naming Rights*** (Adaptive Structures Prize) $25,000.00

A major donor will have rights to the name of the endowment, and the Adaptive Structures Prize. These would be announced as the "Lockheed", "CSA", etc.

Adaptive Structures Prize.

***Minor Naming Rights***

The idea here is to really give the companies some advertisement for their revenue. This can be accomplished by providing professional looking posters and maybe a banner bearing their name.

"Named" best paper awards Materials and Structures ($5000.00 each)

"Named" best paper award for Younger faculty ($5000.00)

We are requesting that TC members provide 'the proper' leads to start the process. In the past we have made contact with various people from various companies. The idea here is to contact the **key** individuals who have benefited directly from advances in this field. An incomplete list of companies where contacts are needed is the following:

| ***Company*** | ***Contact Person*** |
|---|---|
| Lockheed Martin | |
| NextGen Aeronautics | Jay Kudva |
| Boeing | Ed White |
| Northrop Grumman | Probably will not be involved in this area anymore with Jay gone |
| TRS Ceramics | |
| TSI Ceramics | |
| ACX | |
| Dynamic Structures and Materials | Jeff Paine |
| Sensortech Limited | |
| CSA | Conor Johnson |
| Continuum Photonics | Aaron Bent |

**Solution 3. Proceeds from the Sponsorship of a Conference**

The field of smart materials is reaching a crossroads. The infusion of new ideas into the field is needed to sustain and accelerate its growth. A major *international* conference or workshop incorporating this theme could be developed with the revenue being used to provide a major portion of the endowment.

For this 1-1.5 day tutorial-based workshop/conference we can have a series of talks FOR the members of our community instead of BY the members of our community. The theme is long-term growth of our community. This conference will address emerging research areas or advanced topics? What are the technical hurdles that need to be cleared for our involvement? We can also add some of our own people to talk about new areas and limitations. Here's a listing of possible topics for these camps

1. Micro and Nanotechnology and Smart Materials: Can smart materials play a role? Incorporating smart materials as an integral part of next generation integrated circuits using semiconductor materials. A number of semiconductor materials are either piezoelectric or piezoresistive).

-Self Assembled smart materials

2. Bio-inspired Material Systems: Letting nature inspire what we do
    - Bio-Electric and Bio-Magnetic Phenomena
    - Bio-Inspired Robotic Systems and devices
    - Biomimetic Vision
    - Molecular Motors

3. High Stroke Advanced Actuators (more of a materials science flavor than devices)
    - Ferromagnetic SMA's: (James, Ohandley) (6% - 10% Strains)
    - Relaxor Ferroelectrics (Shrout – PSU) (1.7% strains)
    - Alkaline based Piezoelectric materials (.85% strains) (Yet-Ming Chiang)
    - Electroactive Polymers:

4. Advanced Camp. This will be a 1-day session where key DARPA, NIH and HSARPA personnel will make presentations about their core needs and capabilities. The reason for choosing these three agencies lies in the fact that not all of our members have access to them. Insight into future platforms will be solicited and true needs will be assessed. May be more general or smart material based. Specific problems that have been unresolved for long periods of time can also be addressed.

The key for all these camps is that they be tutorial or knowledge generating in nature. For the conference, we should pick somewhere really nice (maybe exotic and somewhat secluded) and stress a family atmosphere. Thus the sessions should end by 2:00 PM both days. We should also NOT have any order to the talks. Thus no one receives an "ordered" agenda until they get to the conference and therefore should plan for being there the whole time. There should also be ample time in between sessions for discussion and collaboration

**The long-term solution is something that we believe we need to consider. We believe a 1-2 year lead-time is required for a workshop; the earliest possible date for such a meeting would be Summer 2007. A successful workshop hinges on obtaining upfront money from DARPA, NSF, ARO, etc. to defray much of the cost. If that does not happen then a workshop is *NOT* a good idea. Towards that end we need to make sure that key supporters are sympathetic to the needs of the committee. It may present a conflict of interest to invite program managers on the TC and then ask them for money.**