

MFE Chamber Peer Review

Dates: Thursday and Friday April 26-27 at UCLA

- Our MFE Chamber Review will be from 8AM to 4PM Thursday
- (The IFE Chamber Review, coordinated by Wayne, will be 4:30-6 PM Thursday and 8-11:30AM Friday)

ALL key people (Task Leaders, Presenters, unique experts, etc.) must be present all the time during the peer review to answer questions.

Review Panel (per Sam Berk):

Leslie Bromberg / Grant Logan / John Sethian / Ken Schultz (Chair)

What we need to do to PREPARE:

Several Items are to be prepared by the team (to be explained more below):

A- Presentations

- To be prepared by the Presenters with input from the team. To be reviewed by the team.

B - Response to How we Satisfied the Criteria

- To be prepared by the Task Leaders and reviewed by the Team (and later synthesized into one summary for MFE Chamber)

C - Lists of publications/students and "individual" (and collective) recognition of research accomplishments and influence on fusion/other fields

- Input to be sent by individuals to Youssef and to Sawan (details under C below)

General Evaluation Criteria

For Peer Review of Scientific and Technical Quality and Progress of R&D Activities in Enabling Technologies Program Elements

I. Quality of Science and Technology (and innovation)

- Validity of scientific methods and approaches
- Effectiveness in using state-of-the-art analytical and experimental tools
- Creativity, innovation, and originality in addressing technical problems
- Quality and completeness of documentation and reporting
- Recognition of research accomplishments by peers, scientific communities, and professional societies (e.g., citations and awards)

II. Productivity and Progress

- Sustained achievement in advancing knowledge and in developing new technologies that advance research capabilities and reduce research costs
- Efficiency and effectiveness of using available research resources, both domestically and internationally
- Rate of progress toward resolving scientific issues and technical problems
- Effectiveness of teaming domestically and internationally for information transfer and synergistic problem-solving

III. Relevance and Impact

- Relevance of research activities to scientific goals for the program element
- Influence on progress in fusion research and establishment of fusion energy scientific foundations
- Use of research results in both domestic and international fusion programs
- Influence on scientific communities and other elements of domestic and international fusion programs
- Contributions to other scientific and technical fields
- Publications in peer-reviewed journals
- Educational benefits, such as effectiveness of attracting and training students to become future fusion scientists and engineers
- Transfer of knowledge and technology developments to industry
- Stature and leadership in domestic and international communities

EVALUATION CRITERIA and Advice from Baker and Berk:

It is absolutely critical for all presenters and task leaders to understand what the evaluation criteria are and work hard to show how has our work satisfied this criteria. This is very critical. I have received a lot of advice on the importance of this, especially from Charles Baker and Sam Berk.

(The ONE PAGE LIST OF EVALUATION CRITERIA IS GIVEN in an ATTACHMENT.)

The following is a quote from Sam Berk that summarizes well his and Charlie's advice/guidance:

"I think that everything evolves around the evaluation criteria. The panel members are asked to structure their evaluations around the criteria and the OFES program manager who prepares the summary of the panel member evaluation reports structures his document around the criteria.

This is an excerpt from a previous message Charlie sent to you: "In planning the presentations, it is vital that each presentation for the MFE and IFE parts explicitly address the review criteria; i.e. the review criteria should serve as the outline and template for organizing each presentation. All material included in the presentations should be presented in such a way as to directly address the criteria. At the end of the presentations, Mohamed and Wayne should give a summary that directly provides integrated and comprehensive answers to each criteria. Do not leave it to the reviewers to search through a pile of viewgraphs to find the relevant material to address each criteria. This has been very important in the past reviews."

I certainly agree with Charlie. One of the problems we have seen in the past is that some presentations, while excellent in the traditional sense, do not provide the information needed to fully assess how the program is doing relative to the evaluation criteria. Unfortunately, in some cases, the information is readily available and compelling, but since it was not provided, reviewers had to work with an incomplete data base. The reviewers are left to do a lot of data mining and guess work.

On the other hand, we do not want to burden presenters with a cumbersome format for communicating their research. We do not want dry, uninspiring presentations.

You need to make a concerted effort to assure that the panel members have the complete information they need to evaluate the program for each criteria. I think that the best compromise would be to spend at least a half-hour of the presentation time at the end going through a recap of the previous material to show how it relates to the evaluation criteria. In some cases, you can provide written information that supports a particular criteria (e.g., list of publications) and just briefly refer to it. Panel members will be free to consider such things later off-line. Sam"

Other Advice:

Other advice I received from someone who served on panels and was key in helping his program in conducting a successful review is (see bullets 4& 5 in particular):

1. Be sure to use your best speakers. it's more important to communicate the message than to let the people who did the work do the talking.
2. Make sure the speakers are coordinated. whatever your message, everyone should be using the same play book. You should hold 1-2 conf. calls and also circulate drafts of all the talks a week in advance to avoid surprises.
3. Don't get bogged down in details. show technical depth without giving a tutorial. the worst thing you can do is bore the reviewers.
4. Don't be subtle. tell the reviewers directly how you succeeded to meet the review criteria. probably you were already asked to wrap up by summarizing how you met the criteria. the summary should repeat the points made in the previous presentations and not bring up new points. that way you reinforce the message one last time.
5. Do the work for the reviewers. in the wrapup talk, we went so far as to provide language suitable for the reviewers to use in their reports (but don't say that). if they are busy and want to minimize their own effort they may adopt some of your own language.

EXAMPLES:

Previously, I sent to you references to previous reviews. The ARIES Review is the most recent and it gives a good example of excellent preparations. All the ARIES presentations given to the Peer Review can be viewed on the following web site (note web address changes since I sent it last time):

<http://ashley.ucsd.edu/MEETINGS/0008REVIEW/>

I urge you to look at these presentations . Ours will be different because the work is different but you will get the main idea.

A- PRESENTATIONS:

Based on the input I received and trying to balance many factors, I came up with the following plan for presentations (the time indicated is actual presentation time, it does not include discussion time):

1) Overview: 40 minutes, Abdou

(10-15 year history, restructuring, initiation of APEX, key chamber elements of APEX, thermomechanics, neutronics, and JUPITER-II, MFE Chamber missions and Goals, organization, technical highlights, important achievements, success examples, relation to and impact on other fusion elements, other scientific fields and international collaboration)

2) Liquid Wall Concepts, Modelling, Experiments: 40 minutes, Morley

(innovative concepts for LWs, evaluation of scientific feasibility of various concepts, fluid flow modelling including DNS, several RANS models, commercially available code modifications, adding MHD in all these models. Role of free surface, turbulence, MHD, and interfacial transport. Interactions with Japan, SBIR, outside scientific community. Experiments, M-Tor, FLIHY, measurement techniques, collaborations among various institutions. Indicate students research areas. Include brief remarks about JUPITER-II thermofluid collaboration)

3) Plasma-Liquid (Surface and Bulk) Interactions (including Plasma Stabilization): 30 minutes, Kaita

(Primary Input from Roglien and Kotschenreuther and PPPL and Tasks A, B, and V; includes plasma-edge modelling, plasma-bulk interactions, innovative ideas for plasma stabilization, interaction with the physics community, brief summary of plasma-surface interaction experiments under ALPS that are relevant to APEX work)

4) Exploration of Options for Testing Liquid Wall in Plasma Devices (e.g. NSTX): 20 minutes, Ulrickson

(Primary Input from Ying, the APEX Task-I plus ALIST groups. Summary of Task-I and ALIST evaluations of options for testing liquid surfaces in plasma devices, show calculations and engineering analysis for liquid surfaces in NSTX, interactions with plasma facilities)

5) Engineering Issues of Liquid Walls: 25 minutes, Nelson

(Brad Nelson will make the presentation in coordination with Sze, Nygren, Smolentsev, Petti and Task-III Group. Progress on identifying, analysis, and resolving key engineering issues of LWs. Show highlights of calculations and engineering drawings. Include earlier and new analysis such as identifying tin-lithium, Gulec's and Huang's calculations and innovative ideas on penetrations, Paul/Brad's drawings for nozzles, calculations ideas for surface renewal/enhancing turbulence/ 2-D MHD turbulence, divertor integration, etc. Also **include SAFETY** work here too. In terms of flibe work, we should briefly summarize it and indicate that we need to study low-conductivity fluids for a lot of reasons: understanding fluid physics, modelling, understanding experimentally interfacial transport, penetrations, etc. So, they are critical to supporting our understanding of liquid metals. From design viewpoint, we should indicate that we need to continue to search for a good low-conductivity fluid in parallel to liquid metals.)

6) Exploration of Innovative Advanced Solid Wall Concepts: 30 minutes, Wong

(Key input from Malang, Mattas, Sawan and Task-IV Group. Include early work on EVOLVE and highlight innovative aspects, also include the more advanced work and boiling experiments on EVOLVE, evaluation of ARIES-type SiC/LiPb, also **include Safety**, etc. Do not dwell on detailed straightforward calculations (as was necessary, for example for helium), but rather focus on all the innovative ideas and the advanced state-of-the-art analysis and experiments. Show coupling to other fields, SBIR, etc.)

7) Structural Materials : 15 minutes, Ghoniem

Zinkle and Ghoniem just wrote a paper on their material work related to APEX. Ghoniem will present with major input from Zinkle and Sharafat. Refer to the paper. Cross-cutting material issues and work for refractory alloys, temperature window, compatibility with liquids, etc.

8) Pebble Bed Thermomechanics Modelling and Experiments: 20 minutes, Ying

micro models for thermal-physical -mechanical properties, models and experiments for effective bulk and interface properties. Include pebble bed ceramics and beryllium and sintered beryllium, interactions with JAERI, FZK, and IEA. Include JUPITER-II and SiC. Highlight students thesis work

9) Summary: 30 minutes, Abdou, et al.

Taking each Category and subcategory of the CRITERIA : summarize how MFE Chamber Research has contributed to and succeeded in meeting these criteria. Give concrete specifics of achievements, scientific quality, innovation, technical progress, productivity, impact, publications, etc.

B-Preparing Response To Evaluation Criteria:

In order to a) help prepare the Summary Presentation (Presentation No.9 above), and to b) help the Presenters prepare good presentations designed to show that we have done well in satisfying the criteria, I ask each of the **TASK LEADERS** to work with his group and **prepare the following DOCUMENT** for their task:

- **Take the Evaluation Criteria and under each subcategory ,write down points/bullets that show important things that we have done to satisfy this criterion (and thus implying that we deserve a high grade)**
 - **(Team members with broader interest are also welcome to send me directly their own list for any or for all the tasks; this would be much appreciated)**
- **As an example. I am attaching the Summary prepared by Najmabadi for the ARIES Peer Review mentioned above. Please look at it as an example. Since our technical work is different, the content of our bullets will be different. Also, I urge you to put more specific and longer list (this would allow us to organize and select the key ones for the summary)**
 - **(For example, in APEX, under effectiveness of using analytical tools for liquid walls we should mention that we are not only using state-of-the art, but we are extending it: DNS and RANS modelling, we are developing new turbulence-free surface- MHD interactions models with considerable physics and powerful software that is taking advantage of advances in (teraflop) computational capabilities . Methods for accounting for radiation deposition ,etc. For Advanced solid walls: something about sophisticated methods for crack propagation, for predicting 2-phase flow behavior, etc. Similarly on the experimental part, many examples can be sited.**
 - **Under innovation there are many examples of what the team has done under advanced solid walls (Innovative lithium boiling with high temp refractory that has potential to achieve high temperature and high power density capability, etc.) and under liquid walls (two-stream flow, surface renewal techniques, delta-wing, etc., discovery of lithium-tin, other examples from engineering, etc. etc.)**

(Thanks Bob Kaita and Tom Rognlien for already providing excellent input to this area. Feel free to revise if you wish. Clement needs to redo his as he misunderstood my initial request. Other Task Leaders must respond. See deadlines below.)

C- Publications and Recognition:

There are two subsets of criteria that require assembly of record:

- Documentation/Publications and student training : M. Youssef sent a request to team members for lists of publications and students/degrees, etc.. He will compile this list and add to it reports (e.g. Interim Report/ Web site, etc.)
- Recognition of Research Accomplishments by Peers, Scientific Communities, and Professional Societies **PLUS** Influence on Fusion Research **PLUS** influence on scientific communities, etc.: M. Sawan will send a request for "individual" information from team members.

Please respond to Youssef and Sawan according to their deadlines.

DEADLINES (for action items for Planning):

This is a **rigorous** schedule that must be **strictly followed** please:

- **March 1:** Finalize plans, including Presenters, etc (during APEX E-Meeting)
- **March 15:** Task Leaders distribute Item B- Response to How work has satisfied the Review Criteria
- **March 21:** Presenters distribute their draft presentations to the entire APEX team (after it has been edited by the Group members of the Task)
- **March 29:** Conference Call 11AM-1PM (PST) among the presenters and APEX Steering Committee
- **April 2:** Presenters e-mail their "almost-final" presentations to the entire team (and Youssef post on the web)
- **April 5 & 6:** "DRY RUN" ELECTRONIC MEETING of presentations attended by the Team. 10:00 a.m. to 2:00 p.m. each day.
- **April 10:** FINAL PRESENTATIONS e-mailed to M. Abdou and M. Youssef (M. Abdou will immediately send the presentations to the Review Panel. M. Youssef will immediately post on the web site under the official Peer Review Button)
- **April 26-27:** Peer Review (Presenters, APEX Steering Committee, and Key experts such as Mike Kotschenreuther, Sergey Smolentsev, etc. attend the Peer Review, others are on site to answer questions as they arise)

It seems like a lot of effort but this is important . We, as a community, have done a lot of excellent work over the past years. Now, we must communicate it well . Thank you all for your hard work.

Mohamed