



Two Park Avenue

tel 1.212.591.7000

New York, NY

fax 1.212.591.7674

10016-5990

U.S.A.

www.asme.org

## AGENDA 2015-2016 BOARD OF GOVERNORS

**Day & Time:** Saturday, November 14, 2015 1:00 PM – 4:30 PM\*

**Location:** Grand Ballroom AB  
Hilton Americas, Houston, TX

### 1. Opening of the Meeting

1:00 PM – 1:05 PM

1.1. Call to Order Julio Guerrero

1.2. Adoption of the Agenda Julio Guerrero ACTION  
A motion should be made to accept the Agenda as circulated on October 30, 2015.

1.3. Announcements and Recognition of Special Guests Julio Guerrero

### 2. Discussion Items

1:05 PM – 2:50 PM

2.1. Committee of the Whole (5 minutes) Julio Guerrero ACTION  
A motion should be made to approve going “as if in Committee of the Whole,” where open discussion is permitted and only a memo of issues discussed by topic is maintained by the Secretary.

2.2. Report on Closed Sessions (5 minutes) INFORMATION  
Julio Guerrero

2.3. Sector Management Committee Report (5 minutes) INFORMATION  
K. Keith Roe  
(Agenda Appendix 4.1.1)

2.4. International Delegation Update (60 minutes) INFORMATION  
a. Peru – William Worek and team  
b. India – Urmila Ghia and team  
c. China – Jack Tuohy and team  
(Agenda Appendix 2.4, Full/detailed report-out in January 2016)

2.5. Public Review of Closed Session Items (30 minutes) INFORMATION  
Julio Guerrero  
a. Strategy Items  
b. Delegation Summary

**\*Closed Session planned for November 14. A separate agenda will be sent to those invited to attend.**

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Break (2:50 – 3:05 PM)

**3. Action Items**

3:05 PM – 3:10 PM

3.1 Motion to Return to Formal Session

A motion should be made to move out “as if in Committee of the Whole.”

**4. Consent Calendar**

3:10 PM – 3:15 PM

The Consent Calendar is limited to items of a routine or non-controversial nature, grouped together to save Board time. Consent Items for Receipt are report items for information, followed by Consent Items for Action that the Board is asked to take action on as a group.

Governors are encouraged to contact ASME Headquarters with their questions prior to the meeting as it is not expected that Consent Receipt or Action items are to be removed from the Agenda. Reports, whether for information or action, are to be in writing and part of the Consent Calendar, unless otherwise approved by the President.

4.1. Consent Items for Receipt

4.1.1 SMC Report

K. Keith Roe

(Agenda Appendix 4.1.1)

INFORMATION

4.1.2 Motion for Receipt

ACTION

4.2 Consent Items for Action

4.2.1 Identification of Items to be removed from Consent Calendar

Any action items to be removed from Consent Calendar by request from any member of the Board of Governors.

4.2.2 Approval of Minutes from Meeting on June 10, 2015

4.2.3 Proposed By-Laws for First Reading

Larry Luna

4.2.3.1 By-Law B4.2.2.4.c

(Agenda Appendix 4.2.3.1)

4.2.3.2 By-Law B5.2.5

(Agenda Appendix 4.2.3.2)

4.2.4 Proposed By-Laws for Second Reading

Larry Luna

4.2.4.1 By-Law B5.7

(Agenda Appendix 4.2.4.1)

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4.2.5 Updated Position Papers  
 Timothy Wei  
 (Appendix 4.2.5)

4.2.6 Dates of Future Meetings.

<b>DATE</b>	<b>DAY</b>	<b>TIME</b>	<b>LOCATION</b>
January 20, 2016 (a)	Wednesday	12:00 PM – 5:00 PM	New York, NY
January 21, 2016 (a)	Thursday	8:00 AM – 12:00 PM	New York, NY
February 11, 2016 (a)	Thursday	12:00 PM – 2:00 PM	Web conference
April 14, 2016 (a)	Thursday	12:00 PM – 5:00 PM	New York, NY
April 15, 2016 (a)	Friday	8:00 AM – 12:00 PM	New York, NY
June 5, 2016 (a)	Sunday	8:30 AM – 4:30 PM	Louisville, KY
June 8, 2016 (b)	Wednesday	10:00 AM – 3:00 PM	Louisville, KY
September 8, 2016(b)	Thursday	12:00 PM – 5:00 PM	New York, NY
September 9, 2016 (b)	Friday	8:00 AM – 12:00 PM	New York, NY

(a) 2015-2016 Board of Governors (b) 2016 – 2017 Board of Governors

4.2.7 Motion for Consent Action

ACTION

**5. Contingency Time for Discussion and Other Business (75 minutes)**

Subject to the President’s discretion, Contingency Time may be used for discussion of items pulled from the Consent Calendar and Other Business.

**6. Adjournment**  
 4:30 PM

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**List of Appendices**

- 2.4 International Delegation Update
- 4.1.1 SMC Report
- 4.2.3.1 By-Law B4.2.2.4.c for First Reading
- 4.2.3.2 By-Law B5.2.5 for First Reading
- 4.2.4.1 By-Law B5.7 for Second Reading
- 4.2.5 Updated Position Papers

**ASME Board of Governors  
Agenda Item  
Cover Memo**

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**Date Submitted: October 23, 2015  
BOG Meeting Date: November 14, 2015  
To: Board of Governors  
From: Sector Management Committee**

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**Agenda Item Executive Summary:** *(Do not exceed the space provided)*

**The report updates the BOG on Sector, GPS/GETT and VOLT related activities and is for information only.**

**Proposed motion for BOG Action:** *(if appropriate)*

**No Action**

**Attachments:  
One**

**Sector Management Committee (SMC)  
Report to the Board of Governors  
October 23, 2015**

**I. SMC Operations**

In August, two conference calls/meetings were held with SMC members, staff and a few other volunteers to review the Sector strategic planning activities. Conversation started at the 2015 Annual Meeting, and was deemed timely for the Enterprise Planning effort. The discussions provided an important link to align Enterprise and Sector plans, and to collectively share ideas and seek ways to build the content ecosystem. The purpose of the meeting was to share the plans, give visibility to potential ideas for cross fertilization of activities or content between Sectors and to provide input to the Enterprise Strategic planning that is ongoing. Regarding the latter, John Goossen and Mike Ireland participated in the calls.

This kind of interaction between SMC members will be continued as the Enterprise Strategy evolves and the SMC works to support integration of the Sector plans and implementation.

*Summary / Observations from the August discussions:*

1. The Sector strategies are essentially aligned with the ASME strategy. They are customer/market focused and utilize a technology perspective.
2. All units referenced the need to collaborate with others to identify new products, services, geographies, etc.
3. The SVPs are excited about the strategy and figuring how they collectively and individually can support an integrated implementation plan. They see this as their role, with the Board remaining at the strategic level.
4. Several challenges were identified:
  - Agility; deciding quickly and acting quickly
  - Examining our funding and business model for each sector
  - Engaging industry – want to be much more engaged at management and executive level in particular than we are today
  - Engaging early career engineers, and in particular on their terms
  - Collaborating with other sectors to maximize the value of our intellectual content, particularly as we increase our technology focus under the new enterprise strategy.
  - Global issues and penetration (over time) in each sector.
5. Bottom Line: SMC and the Sectors are poised to help finalize, communicate and implement the Enterprise Strategy recently approved by the BOG
  - As the “Operations” arm of ASME, SMC and the Sectors have a key role going forward in executing the strategy and making the strategy successful under the guidance of the BOG.
  - BOG will see increased visibility of SMC activities that support these efforts.

## II. Sector Highlights

*Standards & Certification – Laura Hitchcock, Bill Berger*

### Quarterly Highlights

- The Council on Standards and Certification (CSC) last met on June 9, 2015, in conjunction with the ASME Annual Meeting in Jacksonville, and will hold its next meeting on Monday, November, 16, 2015 in conjunction with Congress in Houston.
- The Senior VP, S&C and senior S&C staff continue development of an updated S&C Strategic Plan, as a result of a request from the ASME Past-President. Recommended end-state descriptions of elements of S&C 25 years from now were distributed to members of CSC for their input. The comments submitted during this exercise have been reviewed by the Senior VP and staff, revisions have been made to the initial draft to address the comments, and the revisions are considered to have been accepted by CSC. At its June 9 meeting, CSC held a brainstorming session to begin development of the strategies and tactics to support the end-state descriptions. The results of this brainstorming session were subsequently reviewed by the CSC leadership, which has selected three of the end-state descriptions (with associated strategies and tactics) to propose to the CSC at its November meeting for proceeding with as part of its 2016 Statement of Work.
- ASME was the respondent to an appeal by WJE Associates, Inc., requesting ANSI withdrawal of its approval of the revision to the ASME A120.1 Standard on *Safety Requirements for Powered Platforms and Traveling Ladders and Gantries for Building Maintenance*. This was the fifth appeal by WJE on this item. The latest appeal was denied by ANSI.
- A presentation on ASME Codes and Standards Thermal Energy Storage (TES) Safety Committee and New PTC 53 Energy Storage Committee was given by S&C staff, at the ASME Thermal Energy Storage Workshop, held on June 29th in conjunction with the 2015 ASME Power and Energy Conference. The S&C staff presentation covered the work that ASME standards committees were undertaking, other speakers presented information about fly wheel storage, compressed air storage and the current status of electric utility storage. During the facilitated discussion after the presentations, the attendees indicated that they would be interested in having an additional workshop covering this topic in the future. One attendee is now an active member of the TES committee and has in turn helped to recruit 2 additional members.
- As a result of separate requests from the U.S. Nuclear Regulatory Commission (NRC) and the Pipeline and Hazardous Materials Safety Administration (PHMSA) of the U.S. Dept. of Transportation, S&C agreed to post copies of ASME standards being proposed for incorporation by reference into specific NRC and PHMSA regulations for free read-only access during the public comment period for their proposed rulemaking. These requests were as a result of revised Office of Federal Register rules governing agency requests for standards to be incorporated by reference in their rulemaking that require the agencies to describe how the standards they intend to incorporate by reference are reasonably available, or what actions the agency took to make them reasonably available.

*Technical Events and Content (TEC) Bobby Grimes, Michael Ireland*

*ECS (Energy Conversion & Storage) Segment*

Quarterly Highlights

- The ESC-SLT held their strategic meeting on August 27-28 in New Orleans in conjunction with the ESP-SLT.
- Improved Group Engagement and Market representation – a very nice Monthly Newsletter for communications was created.
- A strategic market gap analysis performed and new business opportunities identified. Market Strategic Sub-segments: 1. Gas turbines 2. Nuclear; 3. Coal; 4. Solar; 5. Wind; 6. Energy Storage. New business opportunities: Internet of things (IOT), Energy harvesting, Adv. Manufacturing intersection in Power Generation (i.e., Gas Turbines), Electric machines, IC Large bore/ high horsepower opportunity focus for conferences, and Smart Grid System Integration.

Upcoming Activities/What's on the Horizon?

- Internal Combustion Engine Conference (ICEF) will take place from Nov 8-11, 2015 in Houston, Texas, with 166 abstracts received, and 138 accepted. An Undergraduate Student Competition will be included, as well as a tour of a GE Oil & Gas facility.
- ASME 2015 Gas Turbine India will be held in Hyderabad, India from December 1-3, 2015 with over 100 abstracts received, and over 200 turbine professionals to attend.
- Turbo Expo 2016 will be held June 13-17 at the COEX Convention Center in Seoul South Korea, first time done in Asia, with 1,937 abstracts submitted.
- Power & Energy 2016 will be held June 26-30 at the Charlotte Convention Center and planning is well underway. This event will be co-located with ICONE 2016.

*ESP (Energy Sources & Processing) Segment*

Quarterly Highlights

- The ESP SLT meeting was held in New Orleans August 28 & 29, 2015. The meeting consisted of a half-day meeting with both ESP- and ECS-SLTs, then the two SLTs held individual meetings. The ESP-SLT discussed the existing and future list of Conferences and Events involving their groups as well as how the industry can be better served; these discussions will continue at meetings during IMECE in Houston.
- The OMAE 2015 Conference was held in St. John's, Newfoundland, Canada on May 30 - June 4, 2015. The conference attendance was 1028 attendees; 15 Sponsors, 10 exhibitors with 877 papers presented in 12 technical tracks.

- The PVP 2015 Conference was held in Boston July 19-23, 2015. The conference had 811 attendees with 630 papers, 25 presentation-only over 10 Technical Tracks, 2 Special Tutorials, 8 Technical Tutorials, 13 sponsors, 14 exhibitors, 2 plenary speakers, and 15 student posters.
- The ASME 2015 International Pipeline Geotechnical Conference (IPG2015) was held on July 15-17 in Bogota, Colombia. A poster session, workshops and a small exhibit area were included. 31 technical papers were published, and 150 delegates were in attendance. IPG 2017 will take place in Lima, Peru. IPG is an international event to promote knowledge sharing, technological progress and international cooperation for advancing the management of natural forces impacting pipelines.
- The Rio Pipeline Conference 2015 was held on September 22-24 in Rio de Janeiro, Brazil. The Pipeline Systems Division (PSD) is a supporting organization of this event. There were 1400 attendees at the conference and exhibition. The PSD holds an exhibit booth, participates in special sessions and present workshops in addition to holding the Global Pipeline Award (GPA) program. OTC Brasil will be held in Rio de Janeiro, Brazil October 27-29, 2015. As one of the OTC conferences, ASME is one of the 13 professional sponsoring societies, so we will have a booth in their exhibit; 15,000 attendees are expected with 140 exhibitors.
- The Petroleum Division Annual Sporting Clays Tournament will be held on October 16, 2015 in Houston. Each year this tournament hosts over 200 industry professionals for a day of competition, networking, and fun. This popular event is in its 10th year and is a must-attend event for many prominent oil & gas companies. The tournament promotes membership awareness and provides fundraising.

### *ESS (Engineering Sciences) Segment*

#### Quarterly Highlights

- MANCEF Progress Update:
  - The co-sponsorship agreement between ASME and the Micro, Nano, and Emerging Technologies Commercialization & Education Foundation (MANCEF) ([www.mancef.org](http://www.mancef.org)) was signed August 2015. ASME and MANCEF will co-sponsor the next MANCEF COMS conference on August 28–31, 2016, in Houston.
  - Representatives from ESS traveled to Krakow, Poland to meet with the MANCEF board and attend the 2015 COMS conference. Plans regarding ASME's prospective acquisition of MANCEF were further developed. ASME and MANCEF will conduct follow-up meetings at ASME headquarters on October 21, and at IMECE on November 14.
- A successful MCMAT 2015 was held in Seattle, June 29–July 1.
- The ESS-SLT held a F2F meeting at ASME 2 Park Ave on June 22. Monthly telecons held.

#### Upcoming Activities/What's on the Horizon?

- Planning for the following ESS conferences are underway and on target for execution:
  - 2015 IMECE, November 13–19 in Houston.
  - 2016 NEMB, February 21–24 in Houston.

- 2016 MNHMT (Micro-Nano, Heat & Mass Transfer), will be held January 4–6 in Singapore. This is the first year that this Heat Transfer & Nano conference will be run with ASME as 100% owner!
- 2016 Heat Transfer/Fluids/ICNMM joint conference, July 10–14 in Washington, DC
- 2016 ASME/MANCEF COMS, August 28–31 in Houston.
- 2017 Fluids Engineering Division Conference, July 30–August 4 in Waikoloa, HI.
- The ASME NanoEngineering for Energy and Sustainability (NEES) Committee continues planning for the inaugural Nanotechnology at the Nexus of Water and Energy (N-NEW) conference, to be held in Abu Dhabi in 2016.
  - ESS-SLT will hold F2F meetings on Oct. 19 at ASME 2 Park, and on Nov. 14 at IMECE in Houston.

### *DMM (Design, Materials, and Manufacturing) Segment*

#### Quarterly Highlights

- AM3D 2015 was successfully offered in conjunction with IDETC/CIE from August 2-5 at the Hynes Convention Center in Boston. Integration between the new industry-oriented AM3D program and the DED and CIE Divisions resulted in strong performance. Total attendance was about 2000.
- An additional 3 – DMM events were offered: MSEC/NAMRC June 8-12 in Charlotte; InterPACK co-located with Microchannels July 6-9 in San Francisco; and SMASIS September 21-23 in Colorado Springs.
- A planning meeting was held for a new ASME 2016 ISPS/InterPACK/IoT conference on September 30, 2015 at Xilinx in San Jose hosted by DMM-SLT member Gamal Refai-Ahmed, Ph.D. Volunteer leaders from ISPS, EPPD and Santa Clara Valley experts attended. Potential dates are June/July 2016 in Silicon Valley.
- DMM-SLT continues to hold telecons on every third Wednesday of each month. Also, the DMM-SLT Chair and Segment Rep hold bi-weekly calls with the DMM Staff Director.

#### Upcoming Activities/What's on the Horizon?

- The Aerospace Division's Adaptive Structures & Materials Systems Technical Committee, that organizes the annual SMASIS conference, would like to spin off and become a new ASME Group.
- Dynamic Systems Controls Conference will be offered from October 28-30, 2015 in Columbus, Ohio. Amip Shah and Jeff Rhoads of the DMM-SLT plan to attend the Executive Committee meeting along with DMM staff on October 28, 2015 to address requested publication tool improvements from the Division. The Managing Director of Publishing, Phil DiVietro, will also attend to share planned updates/improvements to the ASME Conference Tool Box.
- A DMM-SLT meeting with related Divisions who will have representatives at Congress 2015 in Houston is being planned for November 14, 2015 to continue relationship-building with these Divisions.

#### Programs

### *Public Affairs & Outreach – Tim Wei, Reese Meisinger*

#### *Joint Government Relations (GR) and Engineering Education (EE) Initiative*

- The first Workforce Education Advisory Group was created at America Makes, the National Additive Manufacturing Institute. The largely industry-based group is supported Maureen Fang, ASME Advanced Manufacturing Fellow. Tom Perry represents ASME in the group, which met at the ASME AM3D conference in Boston and also conducted a workshop of engineering/technology educators and industry leaders on crafting a roadmap for America Makes workforce education planning.

#### *Engineering for Global Development/E4C*

##### Quarterly Highlights

- ISHOW Global – 2015 program complete with 9 winners from 3 locations. Press coverage on NPR, CNBC India and in Bloomberg Business Week. Partnerships secured for 2016 ISHOW.
- EGD Conference Programming – The EGD Keynote was well received at the Design Automation Conference at IDETC in Boston. Video post-production is underway. Conference programming business plan is being drafted for Foundation and EGD Committee review.
- E4C 2.0 – The new E4C site went live on September 3.
- Engineering for Change Solutions Library 2.0 – A total of 200+ products delivered as part of SL2.0. Currently undergoing integration with E4C 2.0 for release in October.
- DEMAND, ASME Global Development Review – New Editor has been contracted and on-boarded.

##### Upcoming Activities/What's on the Horizon

- ISHOW Global – Global launch of 2016 program at IMECE in November.
- DEMAND, ASME Global Development Review – ASME.org DEMAND landing pages currently in development and scheduled for release in Q2 to support the distribution and marketing strategy.

#### *K12/Diversity/Scholarships*

##### Quarterly Highlights

- The Pre-College Engineering Education Committee is meeting on October 16-17 at NC State to finalize the design principles and overall strategic plan for ASME's K-12 STEM Education Program Portfolio. This includes an onsite visit at Brentwood Magnet Elementary School, which has a K-5 focus on engineering.
- The second year for ASME Inspire launched in September, with a total of 2,893 active student from 97 schools across 26 states engaged.

##### Upcoming Activities/What's on the Horizon

- Diversity & Inclusion Strategy Committee, Nov 2015 - The committee has reviewed and approved the ASME Diversity in STEM position statement. The statement will now go to the Council for approval.
- The annual Women in Engineering reception will be held on Tuesday, November 17, 2015 from 5:00 pm to 6:00 pm. The reception is open to all registered women engineers, as well as ASME leadership.

### *Engineering Education*

#### Quarterly Highlights

- The 2016 International ME Education Leadership (MEED) Summit is scheduled for March 16-19, in Tampa FL and will continue the Advanced Manufacturing emphasis and also focus on the current realities and approaches facing ME departments as they work to increase design-build teaching and facilities capacity while managing historically high enrollments.
- 101 ABET/ASME degree program accreditation evaluations visits were officially scheduled for Sept-Dec 2015 including 33 ME Programs to be evaluated at universities in Colombia, Peru, Philippines, Saudi Arabia, India, Jordan, Turkey, Mexico, Palestine, the UAE and, for the first time, China.
- June 30-July 3 UPADI Planning Conference, Roatan, Honduras. The ASME-led UPADI Education Committee met at the conference for initial planning of sessions/workshops at the 2016 UPADI Biennial Conference in Panama City, Panama.
- Revised ABET General Criteria for Engineering degree programs and Revised program Criteria for Mechanical Engineering Technology Programs, supported by our ASME delegations, were approved in July by the ABET Engineering & Engineering Technology Accreditation Commissions, respectively. Both criteria reference an industry codes and standards education requirement, one of the ASME Engineering Education Vision 2030 advocacy components. The changes will proceed to the ABET Board of Delegates, on which ASME is represented, starting the final approval process in October.
- The NSF-supported ASME/WEPAN project on Transforming Engineering Culture to Advance Inclusion and Diversity (TECAID) was featured in a special session at the June 11-12, WEPAN Change Leader Forum in Denver, CO
- Sep 24-26 – International Pressure Vessel Technology Conference, Shanghai, China - ASME Engineering Education Vision 2030 industry-focus presentation.
- Oct 1-2 - WEPAN/ASME TECAID Workshop #2, Chicago, IL
- Oct 14-17 – ABET Society Liaison Summit and the inaugural meeting of the new ABET Board of Delegates, Baltimore, MD

#### Upcoming Activities/What's on the Horizon?

- 2015 ASME IMECE will feature meetings of the ASME Committee on Engineering Education, ABET Accreditation Committees, ME Department Heads Executive Committee and MEDH Forum, ASME/WEPAN TECAID Project Diversity/Inclusion session and the Tips for Tenure session for early career faculty and PhD. students.

## *Government Relations*

### Quarterly Highlights

- ASME convened a briefing entitled, “Making a Maker,” on June 15, 2015 in partnership with the Council on Undergraduate Research and SAE International. The briefing was part of the “Week of Making,” which included the Capitol Hill Maker Faire and the National Maker Faire. Government Relations also helped facilitate Engineering for Global Development’s participation in the Capitol Hill Maker Faire and the National Maker Faire. ASME Foundation Executive Director Noha El-Ghobashy was in attendance at the White House event at the start of the National Maker Faire, and the launch of E4C 2.0 was included in the White House list of upcoming outside group commitments. EGD Committee member Dr. Nathan Johnson served as a plenary panelist on the National Maker Faire panel, “Exploring the Breadth of Making.” ASME facilitated GRIT’S (<http://www.gogrit.us/team/>) participation in the Capitol Hill Maker Faire, and also provided logistical support for some of the other makers at the Capitol Hill Faire.
- ASME convened two government-related webinars for members on June 24, 2015 and July 15, 2015, the first discussed the proposed federal budget for research and development programs for Fiscal Year 2016 and the second focused on the recent developments for the National Network for Manufacturing Innovation and the Advanced Manufacturing Partnership (AMP) 2.0.
- The 2015 Washington Internships for Students of Engineering (WISE) program ran from June 1- July 31, 2015. ASME sponsored three interns: Garrett Dowd, Paige Balcom (Engineering for Global Development-supported), and David MacPherson (Georgia Tech-supported). More information about the WISE interns’ papers can be found at: <https://www.asme.org/career-education/articles/career-and-education/wise-beyond-their-years>. ASME is currently soliciting for its 2016 intern.
- To review the two position statements issued since May 2015, please visit : <https://www.asme.org/about-asme/get-involved/advocacy-government-relations/policy-publications/position-statements>
- On October 20th, ASME co-sponsored a House STEM Education Caucus briefing entitled, “Building STEM Education Pipeline Aligned with Industry Needs: Perspectives from the Field.” Dr. Oscar Barton of George Mason University will be speaking on ASME’s Vision 2030 initiative.

## *Industry Advisory Board (IAB)*

### Quarterly Highlights

- IAB hosted two webinars in June. The first, presented by Matt Hourihan on the FY16 Federal R&D budget, the second presented by Noha El-Ghobashy on the ASME Foundation.

### Upcoming Activities/What's on the Horizon?

- The IAB will host a webinar, presented by Dr. Dean Bartles, on the Designed Manufacturing and Design Innovation Institute (DMDII) in October in preparation for the November meeting.
- Planning is underway for the November 4-5 meeting, to be held at the Digital Manufacturing and Design Innovation Institute in Chicago, IL.

### *Student & Early Career Development (SECD) – Paul Stevenson, Noha El-Ghobashy*

#### Quarterly Highlights

##### *SECD Sector*

SECD Council is implementing its strategic plan and is working on finalizing the metrics to assess its program portfolio.

##### *Student Programs*

#### Quarterly Highlights

- 17 teams (planned) participated at the HPVC Mexico being held at Tecnológico de Monterrey, Monterrey, Mexico on October 5 – 7, 2015. 11 teams are expected to participate at HPVC Latin America in Bogotá, Colombia at Universidad de los Andes on October 15 - 17, 2015.
- There were 126 students, 44 teams from USA, Canada, India, Mexico, Pakistan, Colombia, and Bangladesh, that participated in the Round I of (Innovative Additive Manufacturing 3D) IAM3D Challenge. Twenty teams were invited to compete for the 5 awards in August at the IDETC/CIE/AM3D conference. The winners included student teams from Texas Tech, Tennessee Tech, Temple University, IIT Roorkee, India, and Sheridan College, Canada.
- There were 44 students, 17 teams that participated in the Round I of Innovative Design Simulation Challenge (IDETC). Twelve teams were invited to compete for 6 awards at the Finals at the IDETC/CIE/AM3D in Boston.
- Last of the 12 global 2015 Student Professional Development Conferences (SPDCs) concluded in Egypt in September. Fourteen “Robots for Relief” SDC finalist teams from the regional SPDCs “Robots for Relief” have been invited to compete at the IMECE in Houston.
- Planning for the 2016 regional SPDC locations supported by the ME Departments is in progress. Confirmed SPDC hosts include Georgia Tech, Rutgers University, Minnesota State University, Northern Arizona University, University of Peru, Tecnológico Nacional de México, Vellore Institute of Technology, India, UET-Texila, Pakistan, American University-Beirut, Lebanon. Several other SPDC hosts are in the final process of confirmation.

### Upcoming Activities/What's on the Horizon?

- Planning has started for the 2016 East and West HPVC's.
- Applications are being accepted for the IAM3D and IDSC Challenges through April 2016.
- 2016 SPDC hosts are in the process of being finalized.
- 2016 HPVC India planning is in progress.
- Articles about the IDETC and IAM3D winning teams are scheduled for publication through various ASME communication channels.

### *Early Career Programs*

#### Quarterly Highlights

- FutureME Mini-Talks held at IDETC Boston (August 2) attracted 154 attendees delivering 5 mini-talks highlighting various aspects and importance of communication including:
  - (1) Overcoming the Challenges of Effective Communication in the Realm of Interdisciplinary Pursuits,
  - (2) Collaboration: Building Connections,
  - (3) Building an Online Brand that Works for Your Career,
  - (4) Pitching Technical Ideas to Non-Technical Audiences,
  - (5) Speak your mind! Learning to Communicate your Career Plans.
- The team is in the process of reviewing transcripts from the IDETC FutureME Mini-Talks for post-production
- Program development is in progress for the IMECE FutureME MiniTalks:
  - IMECE FutureME MiniTalks will take place on Sunday, Nov 15, 2015 in Houston, TX.
  - The program has been outlined and 5 presenters have been confirmed along with moderator.
- The ECE Programming Committee continues to work on branding its portfolio of programs as FutureME programs and on forming new teams to align with three market segments (Energy Source, Power Generation, and Design & Advance Mfg.) to develop content for ECEs in those areas

### Upcoming Activities/What's on the Horizon?

- IDETC FutureME Mini-Talks post-production is underway to release videos on .ORG and YouTube
- Preparation for FutureME Minitalks at IMECE on Nov 15 in Houston, TX

### *Community Development*

#### Quarterly Highlights

- DAG Final Reports are posted on the DAG website

- Applications are being accepted for the Diversity Action Grant program with a deadline on Nov 1, 2015
- Applications are being accepted for the C.T. Main, Arthur L. Williston, Outstanding SSA and ECE OG Awards
- Student leader training program SLTC 2015 will be held on Nov 13-15 in Houston, TX is in planning. This year the programs attracted 190 applicants
- Published ME Today July and September issues featuring the following articles/videos:
  - Video: The Number of Opportunities and Mentoring Prospects
  - Welcome ECLIPSE Interns 2015-16!
  - Video: Designing Real World Activities
  - ASME FutureME Video Contest Announcement
  - Video: Confronting Energy Challenges
  - GO WITH THE FLOW: MIT Invents Sensor Robot for Small Underground Pipes
  - Video: Five Concepts for Success
  - An Ambitious Engineering Student: Angadbir Singh Sabherwal
  - Looking Back: Embracing the Unknown
  - University of Akron Employs Critical Thinking to Present Successful Kids' Career Day
  - Video: ASME Innovation Showcase in Pune, India
  - The Role of Robotic Technology in a Manned Mission to Mars
  - Cornell University Emphasizes Inspiration and Building Effective Teams
  - Video: Fulfilling Your Entrepreneurial Spirit
- ME Today editorial team is working with Public Information on the articles covering topics correlated to career development in general and technical skills for market focus areas (energy sources, power generation, design & advanced manufacturing). The first set of three (3) articles is due September 29
- Eight new student sections were established in India, Egypt, USA, China, and Taiwan. Inquiries from students interested in starting an ASME section at their university continue to increase, including desire to form a collaborative student section in Florida. Student Section Awards and Grants program, now in its second year is gaining momentum amongst student sections. Applications for Student Sections Awards and Grants are being accepted through May 30, 2016.

#### Upcoming Activities/What's on the Horizon?

- Award ceremony for C.T. Main and SSA awards at IMECE 2015.
- Publications of DAG-related articles.
- Work in progress on transitioning ME Today to the Community Development team and setting up a sustainable infrastructure and a pipeline of content from the market segment teams.
- Applications are being accepted for Student Section Awards and Grants through May 2016

## II. Volunteer Orientation and Leadership Training (VOLT) Academy – Marc Goldsmith, Dave Soukup, Clare Bruff

### Quarterly Highlights

- A training webcast was held for the Board of Governors and for staff members who will be participating in the upcoming Board trips to Peru, India and China. The webcast briefed participants on the Foreign Corrupt Practices Act and Anti-Trust Law.
- The 2016-2017 ECLIPSE Intern Application Form has been posted to ASME.org. Applications are due January 4, 2016. Email blasts will be sent to individuals from the ASME member database 3-10 years since the BS graduation as follows: Early October, Early November, Early December and Late December. Additional marketing will be conducted at IMECE. The Sectors will be sent the recommendations made by the ECLIPSE Committee on January 18. They are asked to make their selections of interns by January 25.
- Work continues on the on-line modules of your ASME.
- Reviewed a proposal to COFI to assist in budget training.

### Upcoming Activities/What's on the Horizon?

- Officer-Elect Orientation is scheduled for November 13 in Houston. Reggie Vachon will facilitate this event.
- There will be a reception for alumni of the ECLIPSE, LDI, and MLP programs on November 14 in Houston.
- There will be a meet-up for Cross-Sector Workshop participants on November 15 in Houston.
- There will be a breakfast for the 2014-2015 ECLIPSE Interns on November 15 in Houston. They are working on a white paper focused on making ASME more relevant to early career engineers.
- A workshop titled "Succession Planning for a Successful Future" will be offered twice at the 2015 Congress. Panelists will share valuable insights and lessons learned from their own experience, both professionally and in ASME.

## III. Group Pathways & Support (GPS)/Group Engagement & Transition Team (GETT) – Karen Ohland, Elio Manes

### Quarterly Highlights

- A total of 262 activity approval requests were received and processed through the GPS Requisition Tool between July 2015 and September 2015. Of those, a request by Materials and Energy Recovery Division was not approved by the Energy Conversion & Storage Segment of the Technical Events & Content Sector. A separate detailed report of the 262 activity approval requests has been provided to the SMC. As of the date of this report, over 1,200 group activity requests have been processed by GPS.

- A total of \$264,850 in contributions to the ASME Foundation were pledged by 12 Groups (8 sections and 4 Divisions) in their FY16 Annual Plans submitted through the GPS Requisition Tool. Contributions ranged from \$50 to \$250,000 (Petroleum Division).
- Held a training event on August 22 in Prague, Czech Republic, for Sections leaders from Europe, Middle East and Asia. There was a total of 21 in-person participants.
- Conducted a training event on September 26 in Miami for Section leaders from the U.S., Canada and Latin America. There was a total of 99 participants (70 in-person and an additional 29 via webcast).

#### Upcoming Activities/What's on the Horizon?

- Compiling data on existing Group-level awards for evaluation by the Committee on Honors (COH). This information will assist the COH in instituting guidelines and a process for the approval and establishment of new Group-level award requests submitted to GPS. This work will also assist the COH in assessing changes to Society Policy P-3.2.
- Developing guidelines and procedures for Sections to make requests from the \$250,000 fund that was established by ASME to support approved activities by Sections that do not have sufficient segregated funds.
- Work continues on developing a searchable online Procedures Guide, to be rolled out through the GPS Requisition Tool by January 2016. The Procedures Guide is intended to provide operational details for requirements stipulated in the current Group Operations Guide.
- Upgrades to the GPS Requisition Tool, including improved navigation, will be rolled out by January 2016.
- A face-to-face meeting of the Group Engagement & Transition Team (GETT) is planned for Saturday, November 14, 2015 in conjunction with the ASME Congress in Houston.

**ASME Board of Governors  
Agenda Item  
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**Date Submitted: October 9, 2015  
BOG Meeting Date: November 14, 2015**

**To: Board of Governors  
From: 2016 *Nominating Committee*  
Presented by: Larry Luna, COR Chair  
Agenda Title: Modification to By-Law B4.2.2.4**

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**Agenda Item Executive Summary: *(Do not exceed the space provided)***

**B4.2.2.4 The Nominating Committee will be assisted by a non-voting group of Advisors consisting of three consenting and available past Presidents who have been out of office for one year or more. These Advisors, selected by the Nominating Committee, shall attend all meetings of the Nominating Committee and participate in all its discussions. At the option of the committee, they may also be present during the casting of votes for the slate of nominees. The functions of this group shall be:**

- a. to acquaint the Nominating Committee of the short and long range Society plans;**
- b. to make available their experience in, and their knowledge of the requirements for Society offices; and**
- c. to answer questions regarding the capabilities of potential nominees in relation to the needs and objectives of the Society.**

**After review from the NC and legal counsel, it has been determined that B4.2.2.4c would be based on one person's opinions and would not provide factual information to benefit the Nominating Committee. It has been suggested to eliminate it from the By-Law B4.2.2.4.**

**Proposed motion for BOG Action: *(if appropriate)***

**To eliminate B4.2.2.4c**

**Attachments: None**

**ASME Board of Governors  
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**Date Submitted:** 10/19/15  
**BOG Meeting Date:** 11/14/15

**To: Board of Governors**

**From:** *(Sector/Unit/Task Force/Other)* **Committee on Organization and Rules**

**Presented by:** Larry Luna

**Agenda Title:** **Fiduciary Committee for Defined Contribution Plans**

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**Agenda Item Executive Summary:** *(Do not exceed the space provided)*

Following Best Practice in Defined Contribution Retirement Plan administration, the Executive Director Evaluation and Staff Compensation (EDESC) committee requests Board approval of a new "Fiduciary Committee for Defined Contribution Plans". The Fiduciary Committee for Defined Contribution Plans, under the direction of the EDESC, shall have responsibility to act as Plan Administrator and Named Fiduciary for such plans, and assume such responsibilities as developing investment policy statements, selecting and monitoring investment choices, benchmarking Plan administration expenses and investment plan administrators performance, and selecting, appointing and retaining plan investment, governance and plan administration compliance advisors, as well as having the authority to make ministerial and technically required plan amendments.

Plan amendments reflecting the duties of The Fiduciary Committee for Defined Contribution Plans will be submitted to the Board for approval with the second reading of the By-Law.

The numbering of By-Laws following this one will be updated.

**Proposed motion for BOG Action:** *(if appropriate)*

**Approval of the By-Law establishing the Fiduciary Committee**

**Attachments:** **Proposed By-Law**

### By-Law Change

#### B5.2.5.1

The Committee on Executive Director Evaluation and Staff Compensation, under the direction of the Board of Governors, has specific responsibility for making recommendations to the Board regarding the Executive Director's performance planning and evaluation and for making recommendations to the Board regarding the Executive Director's compensation, including salary and bonus recommendations.

The Committee shall also have the responsibility to advise the Board of Governors on activities of the Society's staff regarding: staff compensation, including bonus programs; volunteer evaluations of staff; staff planning and organization; staff training and development; staff and retiree benefit programs, including pension plans. The committee will also be responsible for staff related Society Policies P-7.1, (Recognition of Staff Members - 5 Years or More of Service) and P-7.2, (Staff Employment Guidelines).

In addition, the Committee has oversight responsibilities for the Pension Plan Trustees and the Fiduciary Committee for Defined Contribution Plans.

#### B5.2.5.2

The Committee shall consist of the President, the President-nominee/elect, the Immediate Past President and three current Board members at-large (serving staggered terms on the Board). The President and Immediate Past President are ex officio members of the committee with vote. The President-nominee/elect is an ex officio member of the Committee without vote. The Immediate Past President shall be the Chair. Although the ASME Treasurer, the Executive Director and the Managing Director, Human and Capital Resources, are not members of the Committee, they will be available to the Committee for consultation as needed. The term of each of the current Board members at-large expires when his/her Board term expires.

#### B5.2.~~65~~.43

The Pension Plan Trustees, under the direction of the Committee on Executive Director Evaluation and Staff Compensation, shall have responsibility, as specified in the American Society of Mechanical Engineers Pension Plan, for the investment and ultimate distribution of the funds and may also act as Plan agent for the service of legal process.

The Pension Plan Trustees shall consist of up to seven members: the Treasurer of ASME; the Assistant Treasurer, and three to five at-large members recommended by the Committee on Executive Director Evaluation and Staff Compensation for appointment by the Board of Governors.

The terms of the at-large members shall be three years ending at the close of the second Society-Wide Meeting on a schedule established by the Committee on Executive Director Evaluation and Staff Compensation. Except as provided in this section, a Pension Plan Trustee who is a member-at-large may serve no more than two consecutive full terms. To be eligible for additional full terms, a member-at-large must be nominated by the Committee on Executive Director Evaluation and Staff Compensation upon a finding by the Committee that specifies exceptional circumstances warranting the additional terms, and a written statement of such findings must accompany the nomination when it is communicated to the Board of Governors by

the Chair of the Committee. The nominee may then be appointed only upon the affirmative vote of two-thirds of the entire Board of Governors.

B5.2.5.4

The Fiduciary Committee for Defined Contribution Plans , under the direction of the Committee on Executive Director Evaluation and Staff Compensation, shall have responsibility, as specified in the ASME Thrift Plan and ASME Defined Contribution (DC) Plan and ASME 457(b) Plan documents, including to act as Plan Administrator and Named Fiduciary for such plans and assume such responsibilities as developing investment policy statements, selecting and monitoring investment choices, benchmarking Plan administration expenses and investment plan administrators performance and selecting, appointing and retaining plan investment, governance and plan administration compliance advisors, as well as having the power to make ministerial and technically required plan amendments.

The Fiduciary Committee for Defined Contribution Plans shall consist of five members; the Executive Director, the Managing Director of Finance, the Managing Director of Human and Capital Resources, the Director of Benefits and Payroll and one member of the Pension Plan Trustees, recommended to the EDESC by the Pension Plan Trustees.

The ASME Staff members of the Committee will be ex-officio members with vote for as long as they hold those positions in the Society. The Pension Plan Trustee member's term will be for as long as he/she is a member of the Pension Plan Trustees.

**ASME Board of Governors  
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**Date Submitted: September 18, 2015**  
**BOG Meeting Date: November 14, 2015**

**To: Board of Governors**  
**From: (Sector/Unit/Task Force/Other) COR**  
**Presented by: Larry Luna**  
**Agenda Title: Revisions to By-Law B5.7 for Second Reading**

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**Agenda Item Executive Summary: (Do not exceed the space provided)**

The Student and Early Career Development Council requests modifications to B5.7.

The Council would like to increase the number of members-at-large from one to three. Because the members-at-large outnumber the committee chairs, a provision has been included to ensure that these members-at-large have had experience in the Sector.

It is reducing the number of units reporting to it to two, the Early Career Programming Committee and the Student Programming Committee. The responsibilities of the units being sunset are being assumed by these two committees.

It is adding the staff Managing Director, Programs, as a non-voting member.

**Proposed motion for BOG Action: (if appropriate)**

Revise By-Law B5.7 as attached.

**Attachments:** Word documents

## B5.7 STUDENT AND EARLY CAREER DEVELOPMENT SECTOR

- B5.7.1.1 The Student and Early Career Development Sector, under the direction of the Board of Governors, is responsible for meeting the needs and providing a voice for students and early career engineers. The Student and Early Career Development Sector will maintain a current Sector Operation Guide that will contain operational details of the Student and Early Career Development Sector that are not in these By-Laws.
- B5.7.1.2 The Student and Early Career Development Sector shall be led by a Council that consists of the following voting membership: a Senior Vice President as Chair; ~~three~~ one members-at-large; and the Chairs of the following: the Student Programming Committee and the Early Career Engineer Programming Committee~~Board on Career Development, Board on Leadership and Recognition, Board on Student Programs, Committee on Collaboration, Committee on Global Perspective, and the Committee on Communication and Marketing.~~ The Director, Student and Early Career Development and the Managing Director, Programs ~~are~~ is a non-voting ~~member~~staff members of the Council.
- B5.7.1.3 The incoming Senior Vice President, Student and Early Career Development shall be nominated by the Student and Early Career Development Council from among its past or present volunteer members for appointment by the Board of Governors for a term of three years. In the event that a past or present volunteer member is not available from the Student and Early Career Development Council, then the Council shall defer to the Board of Governors for the selection. Chairs who have been elected to a term that extends more than one year into a new term of the Senior Vice President of the Student and Early Career Development Sector are not eligible to become the Senior Vice President.
- B5.7.1.4 The members-at-large shall be appointed by the Board of Governors, upon a recommendation of the Student and Early Career Development Council. The term of ~~each~~ the member-at-large shall be one year. At least two of the three members-at-large shall have had previous activity within the Sector.
- B5.7.2.1 The following ~~Committees~~Boards will report directly to the Student and Early Career Development Council: the Early Career Engineer Programming Committee and the Student Programming Committee~~Board on Career Development; the Board on Student Programs; and the Board on Leadership and Recognition.~~
- B5.7.2.2 The Early Career Engineer Programming Committee~~Board on Career Development~~, under the direction of the Student and Early Career Development Council, is responsible for the activities of the Society that relate to career development of early career engineers. The ~~Committee~~Board shall consist of a ~~Committee~~Board Chair, appointed by the Senior Vice President to a term of three years and a membership as determined by the Student and Early Career Development Council.
- B5.7.2.3 The Student Programming Committee~~Board on Student Programs~~, under the direction of the Student and Early Career Development Council, is responsible for development of programs for students. The ~~Committee~~Board shall consist of a

~~Committee~~Board Chair, appointed by the Senior Vice President to a term of three years and a membership as determined by the Student and Early Career Development Council.

~~B5.7.2.4~~ — The Board on Leadership and Recognition, under the direction of the Student and Early Career Development Council, is responsible for activities of the Society that relate to the leadership and recognition of students and early career engineers. The Board shall consist of a Chair, Leadership and Recognition and a membership as determined by the Student and Early Career Development Council.

~~B5.7.3.1~~ — The following committees shall report directly to the Student and Early Career Development Council: the Committee on Collaboration; the Committee on Global Perspective and the Committee on Communication and Marketing.

~~B5.7.3.2~~ — The Committee on Collaboration, under the direction of the Student and Early Career Development Council, is responsible for building the right partnerships with local schools and organizations to sponsor and grow new programs. The Committee on Collaboration will consist of a Chair, appointed by the Senior Vice President, Student and Early Career Development and a membership, as determined by the Student and Early Career Development Council.

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~~B5.7.3.3~~ — The Committee on Global Perspective, under the direction of the Student and Early Career Development Council, shall provide insight on the development of programs for students and early career engineers globally that further ASME strategic objectives. The Committee will consist of a Chair, appointed by the Senior Vice President, Student and Early Career Development and a membership, as determined by the Student and Early Career Development Council.

~~B5.7.3.4~~ — The Committee on Communication and Marketing, under the direction of the Student and Early Career Development Council, shall influence consistent marketing and communication messages and effective delivery channels for the programs serving students and early career engineers. The Committee will consist of a Chair, appointed by the Senior Vice President, Student and Early Career Development and a membership, as determined by the Student and Early Career Development Council.

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**ASME Board of Governors  
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**Date Submitted:** October 22, 2015  
**BOG Meeting Date:** November 15, 2015

**To:** Board of Governors  
**From:** *(Sector/Unit/Task Force/Other)* Public Affairs & Outreach Council  
**Presented by:** Tim Wei, Senior Vice President, PAO  
Kalan Guiley, Chair, Government Relations  
**Agenda Title:** ASME General Position Papers Updated

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**Agenda Item Executive Summary:**

The following three ASME General Position Papers have been updated in accordance with Society Policy 15.1, which states: “Three years following the issue date of each Statement and General Position Paper, the sponsoring unit of ASME must review the statement to determine whether it should be re-affirmed, updated or sunset. Statements not re-affirmed or updated will be sunset.”

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**PS11-01: Engineering America’s Future: Economic Growth through Technological Innovation**

This paper is an update to ASME’s General Position Paper entitled “Engineering America’s Future: Economic Growth through Technological Innovation,” which was initially issued in January 2011. The paper outlines ASME’s ‘guiding principles’ in driving federal investments in research and development. It includes specific recommendations for establishing policies to: encourage private investment in R&D, including basic research; strengthen public-private partnerships; promote a system of standards and conformity assessment procedures that facilitates the transfer and commercialization of innovative technical advances; create initiatives to strengthen STEM education in primary and secondary schools; and support life-long education initiatives to provide employees and employers with the tools necessary to compete in the global economy. This position paper was revised by the Committee on Government Relations of the Public Affairs and Outreach Council. The January 2011 paper is available to view at <http://ppec.asme.org/wp-content/uploads/2015/10/PS11-01.pdf>

**PS12-05: Diversity and Inclusion in the Science, Technology, Engineering, and Mathematics (STEM) Workforce: A Strategic Global Imperative**

This paper is an update to ASME's General Position Paper entitled "Diversity and Inclusion in the Science, Technology, Engineering, and Mathematics (STEM) Workforce: A Strategic Global Perspective," which was initially issued in February 2012. The paper outlines ASME's 'guiding principles' related to diversity and STEM to help ASME and the broader STEM community better envision and implement the concept of diversity and inclusion in the STEM workforce. This position paper was revised by the Diversity and Inclusion Strategy Committee of the Public Affairs and Outreach Council. The paper mirrors the previous version with the exception of updated statistics. The February 2012 paper is available to view at [https://www.asme.org/getmedia/a75fbf4b-164a-4738-b429-d6bc42d714b8/PS1205\\_Diversity\\_Inclusion\\_Science\\_Technology\\_Mathematics.aspx](https://www.asme.org/getmedia/a75fbf4b-164a-4738-b429-d6bc42d714b8/PS1205_Diversity_Inclusion_Science_Technology_Mathematics.aspx)

### **PS12-06: Mandatory Educational Requirements for Engineering Licensure**

This paper is an update to ASME's General Position Paper entitled "Mandatory Educational Requirements for Engineering Licensure," which was initially issued in February 2012. The paper outlines ASME's continued opposition to a mandatory, across-the-board requirement of master's or equivalent (MOE) for professional licensure, beyond the first professional degree currently decreed by tradition and practice. In 2006, the National Council of Examiners for Engineers and Surveyors (NCEES) adopted a change to the Model Law for professional engineers to require that, for an individual to be licensed by a state as a Professional Engineer (PE) in 2015 and beyond, he or she must hold at least a Master's degree in an engineering discipline or its equivalent (MOE). In 2008, NCEES extended the implementation timeline to 2020. In 2014, the provision was taken out of the Model Law, but in 2015, it was put back into NCEES's official documents as a Position Statement with the 2020 date removed. This position paper was revised by the Committee on Government Relations of the Public Affairs and Outreach Council, working with the Licensing That Works Coalition that ASME leads. The February 2012 paper is available to view at <https://www.asme.org/getmedia/f2402620-222b-4445-87cb-45256c8b94d2/PS12-06.aspx>

### **Proposed motion for BOG Action: (if appropriate)**

To approve all three ASME General Position Papers to communicate ASME's guiding principle to the U.S. Congress, the Administration and the engineering, science and technology community at large. The date of issuance for all three position papers will be "January 2016."

### **Attachments:**

Updated versions of the three ASME General Position Papers entitled:

1. Engineering America's Future: Economic Growth through Technological Innovation

2. Diversity and Inclusion in the Science, Technology, Engineering, and Mathematics (STEM) Workforce: A Strategic Global Perspective
3. Mandatory Educational Requirements for Engineering Licensure.

ASME General Position Paper  
January 1, 2016

## Engineering America's Future: Economic Growth through Technological Innovation

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### Introduction

Economic prosperity and growth in the global age is at root a story of technological innovation. Various economic analyses ascribe up to 80% of economic growth in the industrial era to technological advancements. Innovation allows us to make continual improvements in our quality of life and maximize the productivity of our citizens. It also enhances our ability to identify and collect scarce resources and use them efficiently, and to optimize our adverse impact on the earth and its environment. Appropriately directed, technological advancements can also be delivered to the benefit of the global community and can be a driver for national security.

The emergence of the United States in the 20<sup>th</sup> century as the preeminent world economic power was largely attributed to the country's stable political system, vast natural and human resources, and agricultural, manufacturing and engineering prowess. Underlying all of this has been an unceasing capacity for innovation. This innovation made possible remarkable productivity gains in agriculture. Beginning in the 19<sup>th</sup> century, the development and dissemination of science-based best practices in agriculture allowed the nation's growing food needs to be met by ever-smaller numbers of farm workers. This improvement in farm labor productivity enabled people to focus on producing in other markets. Today this manifests itself in our ability to engineer new technologies in areas such as life sciences, environmental sciences, energy, advanced manufacturing and information technology, which define our quality of life and will be crucial to economic growth and prosperity in a global economy.

### Recommendations

Private enterprise will continue to take the lead in technological and engineering innovation, particularly regarding commercialization of new ideas and technologies. The government plays a role through the promulgation of policies that encourage innovation. These policies must be mindful of the long-term, capital-intensive nature of engineering and basic science innovation, recognize the interdisciplinary nature of R&D and understand the need to bridge different funding paths for technology transition. These policies should encourage a regulatory environment for the transfer of research results to application developers and for ease of commercialization. The goal of these policies should support the development and sustenance of a well-educated, technically sophisticated workforce that is sufficiently agile to respond to rapid developments in technology.

Specific recommendations are:

- 1. Ensure substantial public investment in science-based engineering research that recognizes the interdisciplinary nature of innovation.**

Federal funding is crucial to the nation's R&D enterprise. This funding encompasses both publicly supported laboratories operated directly by federal agencies, as well as grants to non-

profit research-performing organizations such as universities and research institutes. In particular basic research, which is defined as that work that is not directly motivated by specific applications, is almost exclusively the domain of government support. The divide between basic research and applications means that there can only be limited assurances that commercial applications will result even from successful research projects. In most cases private enterprises cannot justify investments in research for which the promise of revenue-generating applications is not imminent. In such areas only a shared investment in the precompetitive Science and Technology realm will allow the market to develop. Leadership by the federal government through its investment is a critical component of this enterprise.

Federal research funding should be balanced between biology and the life sciences, where funding generally is largely provided by the National Institutes of Health (NIH), and engineering and the physical sciences, where funding is provided by the Department of Defense (DoD), Department of Energy (DoE), Department of Commerce, National Aeronautics and Space Administration (NASA), or the National Science Foundation (NSF). A balanced federal research portfolio is especially vital to emerging technical areas, which may be highly interdisciplinary and may require distinctly different funding avenues. Balancing the federal investment in multiple fields will foster a knowledge base and capability in multiple research areas.

Federally funded research also supports graduate education. A large percentage of doctoral degree recipients in engineering and science are supported in part by federal funds. These degree recipients go on to play key roles not only in carrying out research, but in training successive generations of engineers and scientists.

The federal government should consider an investment balance that:

- Ensures long-term commitments to science and engineering research by devoting a fixed amount of more than 3% of the total U.S. gross domestic product (GDP) to research and development or a fixed percentage of the federal revenues.
- Continues to support robust investments in basic research for the National Science Foundation, the Department of Energy's Office of Science, the National Institute of Standards and Technology, and the Department of Defense, which supports high risk, but high reward projects.
- Pursues a balanced portfolio of research in physical sciences, engineering, and life sciences, with commitment to the research activity supported by all agencies. This balance should be coordinated through government investment priorities and shared research areas among multiple agencies. Research into focus areas where multiple agency missions benefit should be high in that priority.

## **2. Establish policies that encourage private investment in R&D, including basic research.**

The private sector accounts for an estimated two-thirds of all R&D spending in the U.S. This private R&D effort is focused on development and applications. The federal government has been the primary source of basic research funding in the U.S. for the last century. In order for technology to drive our economic growth in the future, incentives such as R&D tax credits that are dependable and not year to year must be provided.

The role of intellectual property protections in encouraging private R&D investment should also be strengthened and enforced. Such protections, which have both domestic and international

implications, can provide strong financial incentives to undertake fundamental R&D by increasing the likely investment return.

The federal government should:

- Make permanent the R&D tax credit.
- Protect intellectual property and copyright.

### **3. Enact measures to strengthen partnerships between R&D performers and users.**

While it is primarily private industry that innovates through transforming knowledge into new products and services, industry depends heavily on government-funded basic research. The task of transitioning basic research has long been identified as a major obstacle in the R&D pathway.

Partnerships between industry and academic or other research institutions allow industry to be better informed about recent research advances, while allowing the performers of basic research in turn to be cognizant of the needs of industry. Planning and coordination is essential for optimal performance of these partnerships. Federal agencies have long and valuable experience in interacting with industry, academic institutions, and research institutions, and benefit from expanded partnership efforts.

Accordingly, the federal government should:

- Strengthen industry/academic/government partnerships to facilitate the flow of ideas between these parties.
- Stipulate communication on technology transition between parties as conditions of research grants both on the basic research side and the application and development side.
- Support partnerships involving competitive programs that are both cost-shared and merit-reviewed.
- Invest in partnerships that apply commercial technologies to meet government needs in areas such as energy, advanced manufacturing, defense, intelligence, transportation, space, education, and the environment.

### **4. Promote a system of standards and conformity assessment procedures that facilitates the transfer and commercialization of innovative technical advances.**

The globalization of business, the rapid implementation of new technology, and the economic and technological convergence of markets are significantly changing the dynamics of global competition – particularly with respect to the areas of energy and workforce development. As a result, the influence of international product standardization and conformity assessment procedures on the marketability of U.S. products and services abroad is becoming increasingly important. The significance of supporting sound standardization policy is underscored by the U.S. Department of Commerce estimate that standards affect 80% of world commodity trade.

U.S. international trade policies and the bilateral and multilateral agreements designed to harmonize standardization systems are intended to ensure fair and equitable cross border commerce among the signatory nations to these agreements. Intra-national technical standards and conformity assessment systems should not be used by some countries as an exclusionary tool to inhibit extra-national competition. Preservation of U.S. market access for innovative

technology developments will require due diligence by both government and the private sector on the evolving state of international standards practices.

To enhance the commercialization opportunities for new technologies, international standards development and conformity assessment procedures must preserve industry's ability to market products based on those technologies. To accommodate this need, the federal government, through its international trade negotiators and representatives and federal agencies, should:

- Continue to implement provisions of PL 104-113, The Technology Transfer and Advancement Act, to encourage greater use of, and participation in, voluntary consensus standards, accreditation, and conformity assessment programs by government agencies, allowing for increased efficiency, public safety, and reduced costs for taxpayers.
- Support the principles of international standardization including transparency, impartiality and consensus, effectiveness and relevance, and coherence during development, in accordance with the Technical Barriers to Trade (TBT) Agreement.
- Continue to recognize that U.S. domiciled standards-developing organizations produce standards that meet the above criteria, and thus are entitled to favored treatment under the TBT Agreement.
- Support private sector efforts to harmonize requirements among U.S. and international conformity assessment bodies and recognize that harmonization of standards should be addressed on a sectoral basis.
- Protect intellectual property rights in standards.

**5. Create initiatives to broaden the science, technology, engineering and mathematics (STEM) pipeline at the university level, and strengthen STEM education in primary and secondary schools.**

The U.S. economy relies on the productivity, creativity and entrepreneurship of all U.S. citizens. As the workforce becomes increasingly more global and technology-driven, it is essential that the United States align its K-12 core curriculum to the knowledge and skill requirements of its 21<sup>st</sup> century workforce.

The number of undergraduate engineering degrees awarded annually by U.S. universities has fallen from its peak in the mid-1980s, even as overall undergraduate enrollments are increasing; in fact, where engineering degrees made up almost 8% of all earned degrees in the mid-1980s, that figure is less than that amount today. The percentage of women earning B.S. degrees in engineering also peaked in 2002 at nearly 21%, but has not reached that level since that time. Increasing the participation of women and minorities is essential for broadening the STEM pipeline.

The lagging performance of U.S. primary and secondary school students on international math and science assessments similarly augurs poorly for our future global competitiveness. It is vitally important to strengthen STEM education at the K-12 levels. This will require a variety of measures, including the recruitment and training of qualified teachers; the development of curricular standards and materials that emphasize creativity, problem-solving, and critical thinking, along with assessments aligned with those standards; and the encouragement of partnerships between public and private stakeholders to bring practical and hands-on STEM experiences to the classroom.

Proper investment in K-12 STEM education aimed both at improving the performance of U.S. students and increasing recruitment to STEM fields will require substantial, rigorous research into best practices. There has historically been a dearth of research in STEM education, meaning that the true nature of deficiencies in STEM education are ill-defined, as are the proposed remedies. For example, it is not well-understood if the lack of diversity among STEM university graduates owes to problems of recruitment and retention at the university level, to inadequate technical preparation at the secondary school level, or to cultural biases at the different levels of education; nor is it understood even if the problems of racial and gender diversity are fundamentally similar. If these issues can be properly defined, it will be essential to evaluate the proper methods for addressing them. These research efforts would naturally be the domain of NSF or the Department of Education.

The federal government should:

- Coordinate federal programs and activities in support of STEM education and require them to develop a STEM education strategic plan to inform coordinated program and budget planning across the agencies.
- Establish and maintain an inventory of federally sponsored STEM education activities, including documentation on program assessments.
- Support rigorous research, through the Department of Education or NSF, aimed at understanding the current deficiencies in STEM education both in the K-12 and the post-secondary levels, and at identifying best practices for addressing those deficiencies.
- Pursue the adoption of aggressive standards and effective assessment for STEM education in K-12, including reward systems to improve recruitment and retention of outstanding teachers.
- Encourage partnerships to involve private organizations in addressing STEM education improvements.
- Leverage programs such as NSF's Broader Impacts Criterion to encourage large-scale, sustained partnerships among higher education institutions, museums, industry, content developers and providers, research laboratories and centers, and elementary, middle, and high schools to deploy the Nation's science assets in ways that engage tomorrow's STEM innovators.
- Encourage mentoring opportunities for students in K-12 and partnerships that engage students and teachers in K-12 in entrepreneurial, innovative environments.
- Strengthen and re-examine oversight of existing legislation and programs aimed specifically at broadening participation by under-represented groups in STEM fields.
- Award grants to colleges and universities to reform undergraduate STEM education in their institutions, and specify that proposals must include evidence of institutional support for, and commitment to, the proposed reform effort.
- Promote the adoption and/or improvement by states of high-quality common standards and assessments in STEM subject areas.

## **6. Support life-long education initiatives to provide employees and employers with the tools necessary to compete in the global economy.**

Continuing education enables the workforce to stay abreast of technological advances, respond to shifting trends, and supports employability. A technically literate workforce is essential for economic growth and prosperity in today's global economy. Continuing education also fosters stability in the population of technical workers. This workforce stability is important in attracting promising students to technical fields, and also in helping to ensure that institutional knowledge

is retained and can be imparted to successive generations of workers. Return on investment in continuing education must be measured in the long term rather than the short term. Encouragement of continuing education must combine elements of measure intended to promote employment, R&D investment (including fiscal incentives), and aimed at strengthening STEM education.

The federal government should:

- Strengthen tax incentives for workforce development and continuing education, including at the graduate level, both for employers and employees.
- Support research to identify effective means for maintaining the technical currency of the workforce.

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General Position Paper  
of ASME  
on  
Diversity and Inclusion in the Science, Technology, Engineering, and Mathematics (STEM)  
Workforce: A Strategic Global Imperative

ASME is committed to achieving a truly diverse and inclusive science, technology, engineering, and mathematics (STEM) workforce in the U.S. and all over the world. We offer the following guiding principles to help ASME and the broader STEM community better envision and implement the concept of diversity and inclusion in the STEM workforce.

Guiding Principles:<sup>1</sup>

1. Diversity is defined as “the ways in which we differ as individuals or organizations, and the commonalities and similarities that justify and motivate and inspire all people and entities to work collaboratively together in order to achieve mutually beneficial outcomes.”  
  
Diversity “includes differences such as age, gender, ethnicity, physical appearance, thought styles, religion, nationality, socio-economic status, belief systems, sexual orientation, life and work experiences and education. Diversity that is recognized, valued and most importantly, strategically managed within and without an organization can drive successful outcomes and business results.”
2. Inclusion is “the creation of opportunities and the elimination of barriers that allow all people to participate in and contribute to ideation, planning, projects, programs, processes, teams, organizations, social activities, fun or any other meaningful opportunity, that helps achieve successful outcomes.”
3. Strategic Diversity is “the effective deployment of strategies that leverage the strengths of all people and/or of an organization in order to operate successfully within a diverse marketplace or within a uniquely different society, institution, partnership or similar entity.”
4. Managing Diversity is “the ability to effectively inspire and enable all people to:
  - a. align to a common vision
  - b. communicate effectively and assure understanding
  - c. know and accept what is of value to others
  - d. leverage the strengths of others and trust their commitment to deliver as agreed, and
  - e. appropriately recognize and celebrate successes often.”

Policy Recommendations:

Specific to the U.S., ASME would like to offer the following policy recommendations. In 2014, women were awarded 19.9% of engineering bachelor’s degrees, while African Americans and

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<sup>1</sup> ASME Policy 15.11. ASME Policy on Diversity and Inclusion.

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Hispanics represented only 3.5% and 10.1% respectively.<sup>2</sup> While these numbers do represent significant gains from the 1980s, there is still much work that needs to be done.

The U.S. economy relies on the productivity, creativity, and entrepreneurship of all U.S. citizens. With the predicted changes in future U.S. workforce demographics, increasing the participation of women and underrepresented groups in the U.S. STEM workforce must become a 21<sup>st</sup> Century national imperative. We urge policymakers to strengthen and re-examine oversight of existing legislation and programs aimed specifically at increasing and broadening participation by under-represented groups in STEM fields, including that which:

- Increases public awareness of STEM careers, including supporting efforts to foster outreach to all students, teachers, parents, and K-12 guidance counselors;
- Enables all students to have access to a rigorous STEM curriculum, hands-on laboratory experiences, and informal learning that increases academic performance and interest in STEM careers;
- Offers incentives and mentoring for women and under-represented groups to pursue STEM coursework and careers, including teaching careers, and continue to provide professional achievement opportunities post-graduation and throughout their careers;
- Provides all members of society the opportunity to fully participate in the STEM pipeline and workforce by addressing current obstacles to the participation of women and under-represented groups in the STEM workforce, as well as ensuring to acknowledge past accomplishments.

By dramatically improving the participation of women and talent from other under-represented groups in the STEM workforce, the U.S. can leverage the diversity of these individuals to fuel the innovation necessary for our global competitiveness, as well as meet the challenges of a changing world.

XXX 2015

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<sup>2</sup> Yoder, Brian. "Engineering by the Numbers." American Society for Engineering Education 2014. [http://www.asee.org/papers-and-publications/publications/14\\_11-47.pdf](http://www.asee.org/papers-and-publications/publications/14_11-47.pdf)

## General Position Paper of ASME on Mandatory Educational Requirements for Engineering Licensure

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### Introduction

Founded in 1880 as the American Society of Mechanical Engineers, ASME is a not-for-profit professional organization recognized globally for its leadership in providing the engineering community with technical content and a forum for information exchange. With more than 140,000 members worldwide, ASME serves this wide-ranging technical community through high-quality programs in continuing education, the development and maintenance of codes and standards, research, conferences and publications, government relations, and various forms of outreach.

ASME endorses lifelong learning and encourages mechanical engineers to pursue graduate degrees in engineering. As the quality of engineering education improves around the world, in order to remain globally competitive, engineers who wish to advance in their careers will need to continue their education either through formal study leading to a degree, or through the various types of continuing education that are offered.

### Background

In 2006, the National Council of Examiners for Engineers and Surveyors (NCEES) adopted a change to the Model Law for professional engineers to require that, for an individual to be licensed by a state as a Professional Engineer (PE) in 2015 and beyond, he or she must hold at least a Master's degree in an engineering discipline or its equivalent (MOE). In 2008, NCEES extended the implementation timeline to 2020. In 2014, the provision was taken out of the Model Law, but in 2015, it was put back into NCEES's official documents as a Position Statement with the 2020 date removed. NCEES claims that it was motivated to add additional education by the decline in university and college requirements for a bachelor's degree in engineering from an average of 144 semester credits 30 years ago to an average of 128 credits today.

The First Professional Degree (FPD) in engineering has long been considered to be the degree needed for the practice of engineering. The FPD informs the public and licensing bodies about the minimum requirements that qualify an aspiring professional for practice. Since the 1920s, the FPD in engineering in most regions of the world has been a baccalaureate degree, requiring the equivalent of full time study of approximately four years.

Current engineering baccalaureate degrees typically require courses in mathematics; exact sciences and life sciences; fundamentals and practice of engineering; laboratory and design experience; metrology and experimentation; ethics and professionalism; and selected topics from other disciplines, including the liberal arts and business. Some programs also include industry-based experience in the form of cooperative education or internships.

### ASME Position Statement on Master's or Equivalent (MOE)

ASME opposes a mandatory, across-the-board requirement of MOE, beyond the FPD currently decreed

by tradition and practice.

ASME believes that the typical scope of an ABET accredited bachelor's degree can be and has been demonstrated to accommodate technical breadth and flexibility and the intellectual skills necessary for engineering graduates to qualify for employment in an engineering position. In addition, it is the appropriate qualification to attain licensure as a Professional Engineer. The steps in achieving that status are: (1) passing the Fundamentals of Engineering (FE) Examination, (2) successfully completing a four-year internship under a licensed engineer and (3) passing the final Principles and Practice (PE) Examination. Before being licensed as a Professional Engineer, these steps assure that the knowledge, skill and ethical standards expected from a Professional Engineer are attained. Continuing education is essential to the attainment and maintenance of licensure, as well as a life-long necessity for engineers of all disciplines beyond the studies that qualified them for the FPD. Continuing education helps PEs stay up-to-date with developments beyond their classroom and professional experience.

ASME believes that increasing educational requirements for licensure should not be used as a tool to offset the decrease in graduation requirements for the FPD. Over the past decades, legislatures and state higher education authorities have reduced the course load required for a baccalaureate degree in engineering to an average of 128 semester credits. From 2004 to 2014, however, data available to ASME shows that the average decrease was a mere 1.4 semester hours, and that this downward trend has plateaued. ASME believes that the current number of total hours is sufficient. Yet, even with this gradual change over time, there has been no drop in the national test scores in either the FE or PE examinations required for engineering licensure. In order to produce such results, the approach to educating an engineer has had to become more focused and efficient.

Improved technology has also contributed significantly, i.e. computers have replaced slide rules, and CAD software has replaced drawing by hand on drafting tables. The outcomes-based assessment of modern engineering programs has resulted in better, more focused coursework and computational capabilities are significantly superior to those available decades ago. Most of the decrease in credits is a result of the removal of physical education, ROTC, and basic math and science courses that are now taught in high schools. Thus, the need for increased hours is not required.

The reason for engineering licensure is to protect the safety, health and welfare of the public (as stated in the National Society of Professional Engineers Code of Ethics and in the codes of most of the other engineering societies). Legislation in these matters should be used for the purpose of public safety only. Increasing the prestige or status of the profession by raising the bar to access does not contribute to the profession nor does it serve the public. The value and effectiveness of the work that engineers do should be the sole measure of the profession. Professionalism and continuous education across the decades of an engineering career, together with strict adherence to the canons of ethics, are the real foundations of public safety.

We currently have a workable, effective and adaptable system of examinations and supervision in practice that results in highly competent professional engineers. We also have a system of state oversight that can take action against an individual engineer or part of the system that can be demonstrated to have fallen short of professional expectations. If more front-end coursework is the remedy, it should be employed because public safety is at risk due to poorly educated engineers. This is not the case now, nor are we seeing early indicators that it will be the case in the foreseeable future.

The people of the United States and the legislative and executive branches of the U.S. government are concerned with enhancing the nation's capabilities in science, technology, engineering, and math (STEM). To compete in the modern technological society and global economy, it is imperative that we expand our technologically capable workforce.

However, the percentage of students studying engineering compared to overall students enrolled in four-year colleges is shrinking. In 1981, 6.7 percent of degrees awarded in the U.S. were in engineering. In 1986, the figure rose to a high of 7.8 percent. Today it has dropped to 4.7 percent.<sup>1</sup> These statistics show we could be losing potential innovators to other majors each year.

The engineering degree is one of the most challenging programs of study that one may undertake at the university and requiring a Master's or Equivalent will make becoming an engineer appear even more difficult, which could further detract some of the highly capable students needed to ensure U.S. technological growth. Increasing the professional licensing requirements also has the potential to reduce the supply of licensed engineers who are able to practice and therefore reduce the U.S.'s technological competitiveness.

Because technological change is continuous over the typical 40 years of a professional engineering career, the additional courses taken at the beginning of a career have a rapidly decreasing usefulness compared to the continuing education required in most states to maintain licensure. In addition, many graduates are required to take highly specialized short courses, unavailable in universities, relating to their new job duties.

In addition, most graduate schools require a 3.0 grade point average for admission. If we say that a master's degree is a requirement for professional practice, we are telling many of our students that they are not qualified for a license.

ASME also opposes the implementation of MOE for only selected engineering disciplines. The line between disciplines can at times be difficult to establish. Individual professionals must exercise the appropriate professional judgment, autonomy and discretion to perform services only in the areas of their competence.

Finally, there is also no evidence to suggest that earning a Master's or adding thirty credit hours, which represents a full academic year of upper-level undergraduate coursework or graduate-level coursework, will have a positive impact on the public's health and safety. The fundamental issues affecting the public are already adequately covered under the current education, testing and experience requirements of licensure. We believe that it is misguided to add a year of coursework on the front-end of a professional career as a remedy to a public safety problem that has not been demonstrated. It will discourage students from seeking a career in engineering by significantly adding to the time and cost of their education.

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<sup>1</sup> Digest of Education Statistics, National Center for Education Statistics, U.S. Department of Education, accessed September 25, 2015.

Conclusion:

In conclusion, ASME opposes a mandatory, across the board requirement of MOE, beyond the FPD currently decreed by tradition and practice, for the following reasons:

- ASME believes that the typical scope of an ABET accredited bachelor's degree can and has been demonstrated to accommodate technical breadth and flexibility and the intellectual skills necessary for engineering graduates to (1) pass the Fundamentals of Engineering Examination, (2) successfully complete a four-year internship under a licensed engineer and (3) go on to pass the final Principles and Practice Examination before being licensed as a Professional Engineer.
- Continuing education is an essential life-long need for engineers, and significant learning is necessary for engineers of all disciplines beyond the studies that qualified them for the FPD. These principles are already incorporated within the present system as most states require professional development credits to maintain licensure.
- There is no clear benefit to requiring MOE, but there is considerable cost that will affect both firms and individuals (tuition, time off, fees, books, commuting, etc.).
- Due to the federated nature of licensing jurisdictions, some states may adopt MOE and others will not, causing disparities and hindering licensee mobility. Equivalency of other non-university-based courses also will be a major concern.
- ASME will continue to review the body of knowledge required for entry-level engineers not from the standpoint of professional registration, which has been addressed above, but from the standpoint of the global competitiveness of graduating mechanical engineers.
- We are prepared to oppose the acceptance of MOE jurisdiction-by-jurisdiction if it comes before individual legislatures and/or licensing boards.

ASME believes legislating this new barrier to entry into the profession is not in the public's interest and comes at the expense of engineering students, their parents, and anyone who employs engineering services.

*This General Position Paper was approved by the ASME Board of Governors on November XX, 2015.*