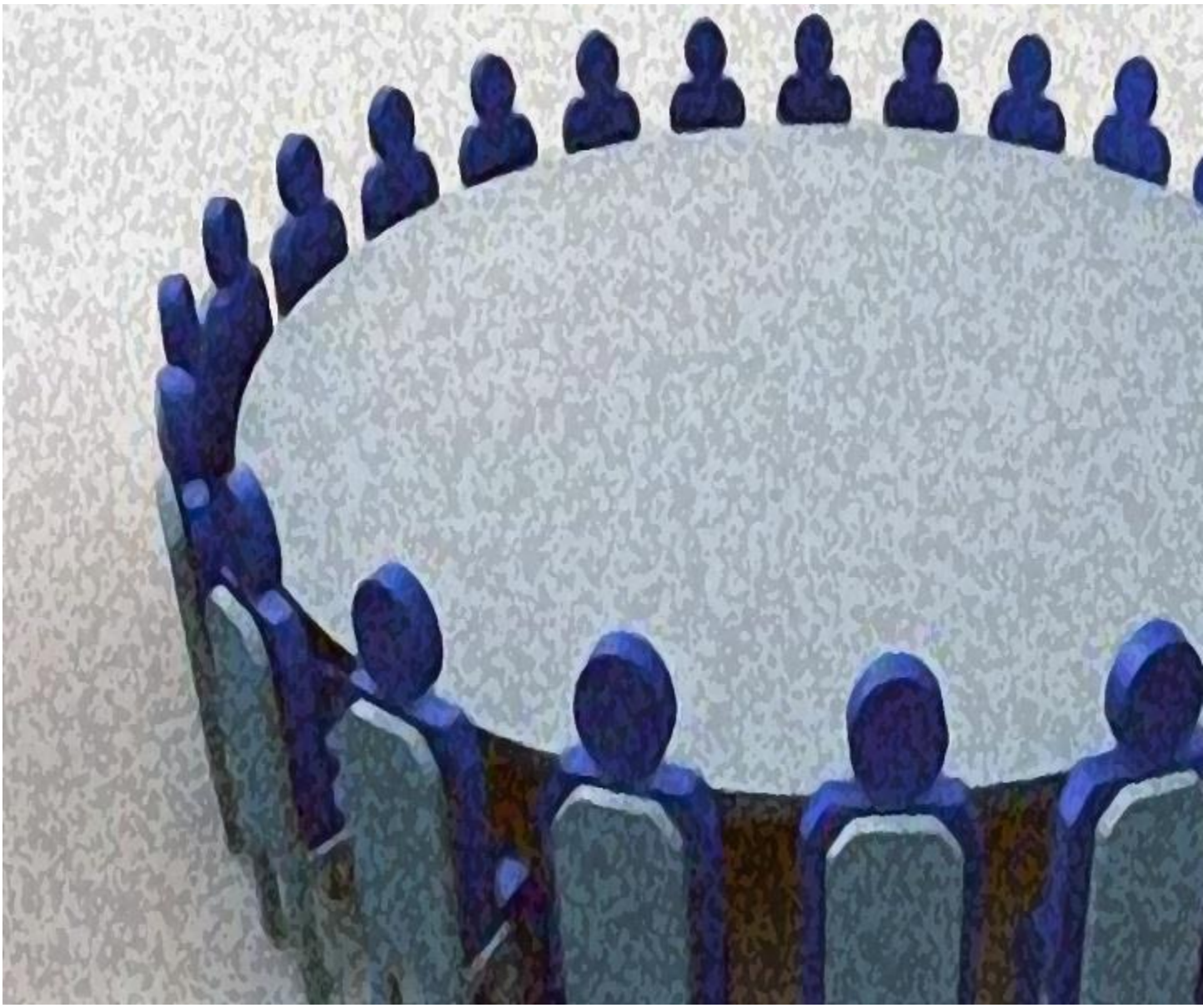

Uncategorized

MEMS Commercialization Report Card – Part 10: Industry Association, Part 1

By Roger H. Grace & Andrew Oliver Ph.D.

Introduction

Welcome back to the MEMS Commercialization Report Card series. This will be the first of two parts on the topic of industry associations in the continuing series, which provides the details of the 2018 Report Card and the rationale for its current and the previous year's grades. As in previous articles, the major content of this and the article that follows is based on personal interviews with individuals who represent the management of several US and European MEMS, sensors, and microsystems associations.

In the early Report Card development process, it was evident that industry associations were a critical element in the commercialization of MEMS and other industries. Today, there are literally thousands of industry associations globally. The ones that we address here have a focus on the international microelectronics industry, particularly MEMS and sensors. These include OE-A, IVAM, MANCEF, and MSIG. Many other excellent industry associations exist that peripherally address the MEMS and sensors areas including AEA, iNEMI, MEPTEC, and SEMI.

Report-Card Grades

Figure 1 provides the Report Card grades for industry associations from 2001 to present. This topic was introduced after the first appearance of the Report Card in 1998.

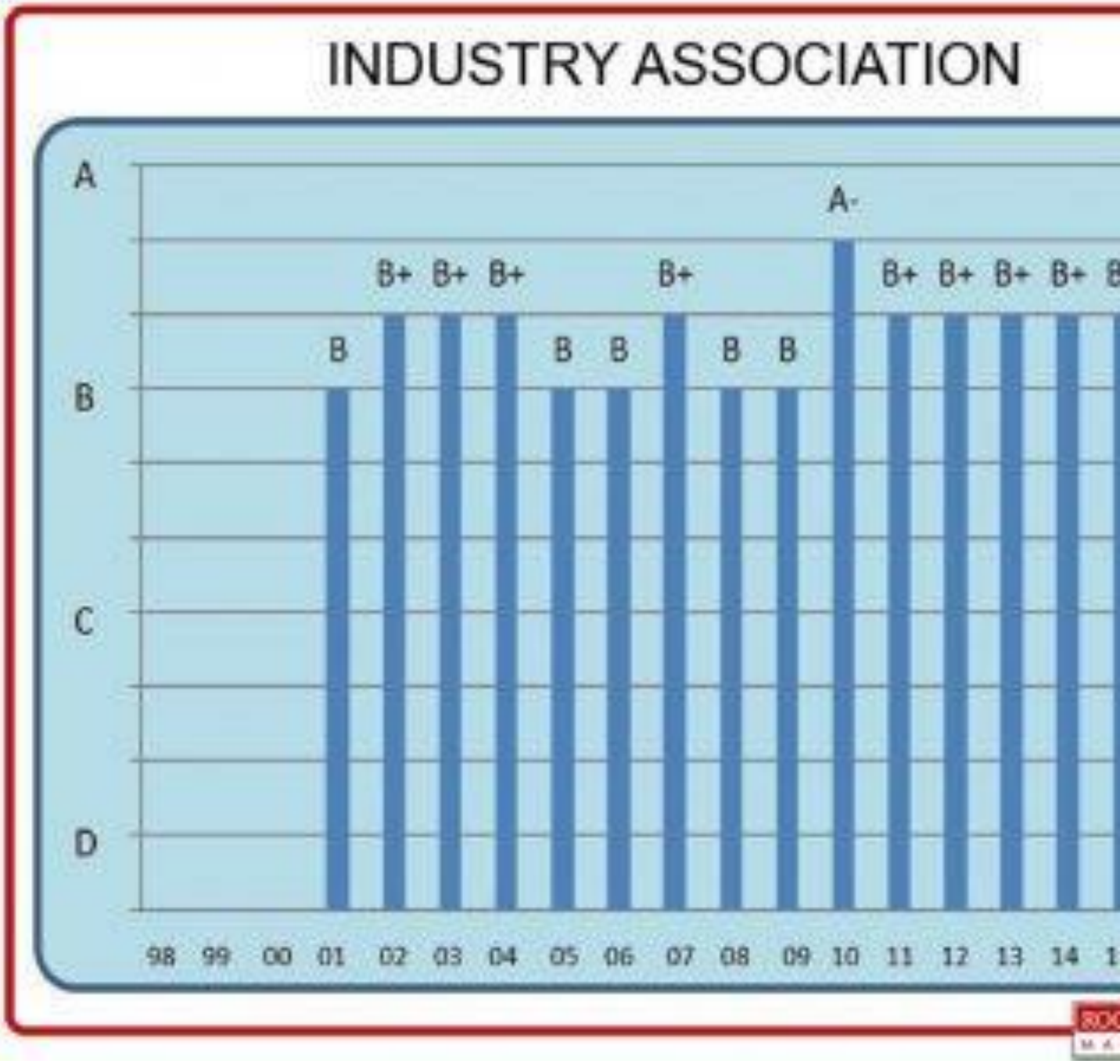

Fig. 1: The 2018 MEMS Commercialization Report Card grade for industry associations was B-. This was a two-grade level reduction from B+ in 2017 and a three-level grade reduction from a grade of A- in 2016. Industry association has historically achieved the best grades of all 14 topics evaluated. Standard deviation (SD) was 0.75, one of the lowest. Courtesy: Roger Grace Associates

As one can see, this topic has received favorable grades from its inception. The 2018 grade was B- , which was two grades lower than the B+ grade in 2017 and three grades lower than the A- of 2016. It is interesting to note that the industry association grade has never fallen to this level since its introduction in 2001.

The research process collected the opinions of 35 MEMS experts representing the US, Asia, and Europe and created the Report Card based on their assigned grades as well as their verbatims of the rationale of the grades. Based on verbatims of the market research, we believe that the cause of the significant decrease in grade level could possibly be attributed to the decline in popularity, influence, and perceived contribution to successful commercialization efforts of MEMS and sensors by the MEMS and Sensors Industry Group (MSIG).

Evolution & Background

An early industry group addressing microsystems and dating back to the early 1990's was the IVAM organization of Dortmund, Germany. This organization exists to this day. Additionally, the European Community began funding of the Nexus organization in the mid 1990's. This organization was supported by a group of volunteers and lead by Mr. Gaetan Menozzi who, with his board of directors, helped create "user-supplier" groups. These groups, which focus on industry sectors including automotive, defense, industrial, and consumer, were made up of senior management from EC organizations and helped to create market studies[1] and roadmaps[2] that were valuable to the MEMS community.

Also, in the US, year 2000, the Micro and Nanotechnology Commercialization Foundation (MANCEF) was created by Professor Steve Walsh of the University of New Mexico, Roger Grace of Roger Grace Associates, and Job Elders a successful Dutch serial entrepreneur. The MEMS Industry Group (MIG) soon followed in 2001 and, by that time, MANCEF had created several Commercialization of Microsystems Conferences (COMS) in Canada, Hawaii, and Michigan. All of these organizations' raison d'etre was to support the commercialization of the current fast growth of MEMS technology. With the exception of NEXUS, these organizations continue to this day and are focused on the same topic: commercialization of MEMS, sensors, and microsystems.

***In the spirit of full disclosure, Roger Grace and Andrew Oliver are members of the MANCEF Board of Directors.**

Membership Benefits Supporting Successful Commercialization

Each industry association offers unique benefits to its members. It is our opinion that the most valuable benefits to MEMS and the sensor community include:

- **Creation and distribution of roadmaps[3], e.g., MANCEF, OE-A, iNEMI and marketing reports e.g. NEXUS, IVAM**
- **Creation and publishing of standards[4], e.g., MSIG, iNEMI**
- **Conferences / seminars e.g. OE-A, MANCEF, IVAM, MSIG,**
- **Educational activities especially now with websites, social media webinars and blogs[5], e.g., OE-A, MANCEF, IVAM, MSIG**
- **Job banks, e.g., MSIG**
- **Lobbying governments, e.g., MSIG vis-à-vis SEMI**

The ability of industry associations to adequately provide these benefits to their members is the prime basis for their success, meaning the creation of member value.

Industry Association Profiles

The following paragraphs provide edited comments from personal interviews of the managing directors of these organizations.

The Micro, Nano and Emerging Technologies Commercialization Education Foundation (MANCEF)

MANCEF, which was formerly called the Micro and Nanotechnologies Commercialization Foundation, is a not-for- profit US Treasury 501.c.3 education foundation founded in 2000. Its co-founders were Professor Steve Walsh of the University of New Mexico, Roger H. Grace of Roger Grace Associates, and Dr. Job Elders, a Dutch MEMS serial entrepreneur. Its headquarters is in Wimberley Texas.

Dr. Todd Christensen is its current president. Walsh served as its first president followed by Grace. Dr. Christensen is a MEMS industry veteran serving previously as a researcher at Sandia National Labs and currently as the COO of HT Microanalytical ,which he co-founded. The MANCEF volunteer board of directors consists of six members of its executive board and 12 members of its strategic operations board.

New tools are continuously cultivated by MANCEF's directorship and brought to bear on the plethora of practical commercialization barriers found when bringing new technology to market. In this process, MANCEF helps stakeholders by applying its best practices, road mapping, and extensive networking know-how to those who work with and complement tech transfer offices, accelerators, and technology incubators. New tools are continuously cultivated by MANCEF's directorship and brought to bear on the practical commercialization barriers such as regulatory issues and cash-flow maintenance.

A major undertaking and significant contribution to the microtechnology community was its 614-page International MEMS, Microsystems Top-Down Nano Roadmap.[6] Published in 2000, it is considered by the MEMS community to be the most exhaustive work on the topic to date. Many of its contributors were motivated by their attendance at several previous COMS meeting. This year's 24th. annual COMS2020 is expected to take place in Rockville, MD, October 19-22, 2020. More information may be found on the MANCEF website.

The MEMS and Sensors Industry Group (MSIG)

MSIG was founded in 2001 in Pittsburgh, PA as the MEMS Industry Group (MIG) and was the brainchild of Dr. Kaigman Gabriel, a MEMS industry pioneer and, at that time, a program manager at DARPA, which provided initial funding. In 2017, it was renamed as the MEMS and Sensors Industry Group (MSIG), became a member of the SEMI Technologies Community, and moved to SEMI headquarters in Milpitas, CA.

MSIG is directed by its Governing Counsel of MEMS industry volunteers and its mission is to connect the MEMS and sensors eco-system by enabling collaboration and innovation through

information sharing and industry networking. MIG's early success was primarily driven by its colorful and passionate executive director, Karen Lightman. Under Karen's direction, MIG grew from a small base of organizations and venues to become a significant contributor to the MEMS community.

In addition to its annual MEMS and Sensors Executive Congress (MSEC), MIG was the catalyst to create two of only a dozen MEMS standards[7]. The most recent standard being issued in early 2020 addresses MEMS testing and nomenclature. These were created by a multi-company working group of dedicated volunteers. Members are primarily from the industry side and include device suppliers.

Currently, MSIG is perhaps the most popular MEMS industry association, however, with the recent absorption by SEMI and the subsequent departure of Ms. Lightman in 2018, it appears that its popularity and influence has declined. We believe that this is reflected in the Report Card verbatims and in the recent decrease in attendance at events. The focus of MSIG continues to be the silicon-based MEMS in line with the semiconductor mission of SEMI.

Summary & Conclusions

This is the first of two parts on the topic of industry associations on the continuing series on the 2018 MEMS Commercialization Report Card (Report Card). Previous chapters address several of the Report Card's 14 topics and an article on Marketing in a Recession considers the current situation of conducting business amid the Covid-19 pandemic[8].

This article on industry associations addresses three of the Report Card topics: road mapping, employment resources, and standards (see figure 2). In the overall scheme of things, the 2018 Report Card grade of B- was a major departure of two grades from its B+ grade in 2017 and three grades from its high of A- in 2016 and in 2010. It appears, in the market research verbatims, that this loss in stature of the value of industry associations in the commercialization of MEMS could possibly be driven by the apparent loss of popularity and influence of the MSIG.

MEMS 2018 COMMERCIALIZATION REPORT CARD

SUBJECT / YEAR	98	99	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	A
R&D	A	A	A	A	A	A-	A-	A-	A-	A-	B+	B	B	B+	B	B	B	B	B+	A-	A-	0
Marketing	C-	C	C+	C+	C+	C	C	C+	C+	C+	C+	C	C	C+	C+	B-	B-	B	B	B	B	0
Market Research	C	B-	B-	B-	B	B	B+	B-	B	B	B	B+	A-	B	B-	B-	B-	C+	C+	B-	B-	0
Design For Manufacturing	C+	B-	B	B	B	B	B	C+	B-	B	B+	A-	A-	B+	B-	B	B+	A-	A-	A-	B+	-1
Established Infrastructure	C+	B	B+	A	A	A	A	A-	A-	A-	B+	B+	A-	A-	A-	A-	A-	A-	A-	A-	A-	0
Management Expertise	C	C	C+	C+	C+	C+	C+	B-	B-	B	B	B	B	B	B	B	B	B	B	B	B	0
Venture Capital Attraction	C	B-	B+	A	C	C-	C	C+	C+	C	C-	D	D+	D+	D+	D+	D+	D	D	D+	C-	1
Creation Of Wealth	C	B-	B+	A	C	C-	C-	C-	C-	C	C-	D+	C-	C+	C+	C+	B-	C+	C+	C+	C+	0
Profitability	C-	C-	C-	C-	C-	C-	C-	C	C+	C	C-	D+	D	C-	C	C+	C+	C	C-	C-	C	1
Industry Roadmap	INC	B-	B	B+	A-	A	A	B	B-	C+	C-	C-	C	C	C	C+	B-	C+	C	C-	C	1
Industry Association	INC	INC	INC	B	B+	B+	B+	B	B	B+	B	B	A-	B+	B+	B+	B+	B+	A-	B+	B-	-2
Standards	INC	INC	INC	INC	C	B-	B-	B-	C+	C	C	C	C+	C	C	C+	B-	C+	C-	C-	C-	0
Employment	INC	INC	INC	INC	INC	C	C	C+	C+	C+	C	C-	C	C+	C+	C+	B-	B-	B	B	B	0
Cluster Development	INC	INC	INC	INC	INC	B	B+	B+	B	B-	C+	C+	C+	C	C+	C+	B-	C+	B-	C+	C+	0
Overall Grade	C+	B-	B	B	B-	B	B	B	B-	B	C+	C+	B-	B-	B-	B-	B	B-	B	B-	B-	0

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Fig. 2: The MEMS Commercialization Report Card was initiated in 1998 and has tracked the annual performance of the 14 topics. Information provided from the three of the 14 topics tracked are considered to be critical for industry associations to deliver to their members: roadmaps, standards, and employment. Courtesy: Roger Grace Associates

Industry associations must continue to do their job of educating the MEMS and sensors community, a job that is becoming more difficult in the Covid-19 environment and the cancelling of conferences.

As in my previous article[9], Marketing Part 4, the adoption of social media strategies will be critical to maintain the necessary level of education. Industry pundits have stated that webinars will become the new normal for conferences[10]. However, the loss of frequent and valuable personal interaction associated with attendance and participation at conferences will be a challenge until the requirement of social distancing is downgraded and/or eliminated.

Moreover, roadmaps and standards will also be important for industry associations to support. Industry associations must be totally committed to continuously listen and to subsequently accommodate the needs of their members and demonstrate their value.

Followers of this series on the Report Card are encouraged to email me at rgrace@rgrace.com if they wish to participate in the 2019 Report Card study which is planned for publication by June 2020.

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About the Authors

 **Andrew Oliver**

Andrew Oliver PMP MBA Ph.D. has worked for more than 20 years in MEMS and microsystem including nine years at Sandia National Laboratories where he developed a wafer level packaging technology. He managed the foundry and packaging relationships for ICx Photonics which used vacuum packaging and led the team that launched the first MEMS gyroscope at Freescale.

Andrew also worked in industrial outreach at the WIMS2 Research Center at the University of Michigan and was an adjunct professor at the University of New Mexico. In addition to large company, national laboratory, and academic experience, he has worked in small companies that were supported by SBIRs and STTRs as well as a startup.

In addition to being a certified project manager (PMP), he holds a Ph.D. in electrical engineering from the University of Michigan and an MBA from Penn State University. Currently, he is a board member at MANCEF.

Roger H. Grace

Roger H. Grace is president of Roger Grace Associates, a Naples, Florida-based strategic marketing consulting firm specializing in high technology. His educational background includes a BSEE and MSEE (as a Raytheon Company fellow) from Northeastern University, and the MBA program at Haas Graduate School of Business at U.C. Berkeley. He has specialized in sensors and ICs for over 35 years with a focus on micro electromechanical systems (MEMS). He has authored over 75 technical papers and articles, organized, chaired, and spoken at over 50 international technical conferences. Roger is frequently quoted as an industry expert in major international technical and business publications on the topic of technology commercialization. He was the co-founder, past president, and currently is the Vice President of the Americas of the Micro, Nano and Emerging Technologies Commercialization Education Foundation (MANCEF) and served on the Board of Directors of the Florida Manufacturing Extension Partnership from 2008 to 2014. For more details, contact Roger via email at rgrace@rgrace.com and to learn more, visit www.rgrace.com.