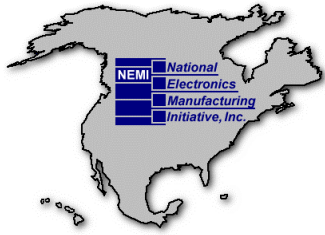


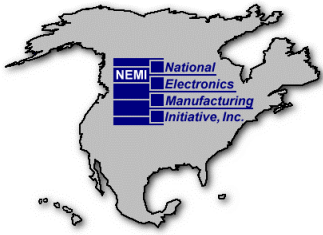
Industry/Academia Collaboration for Manufacturing R&D

*APEX Forum F-12 - 01/17/01
Includes Summary of Discussion*



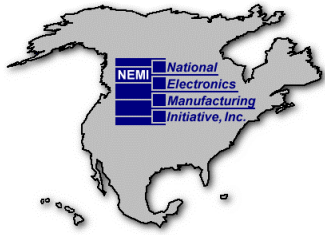
Background

- **Electronics Industry continues to experience major restructuring:**
 - Focus of companies on a few Core Competencies
 - Outsourcing of many other functions
- **Roles and Responsibilities are Changing:**
 - OEMs more interested in orchestration of supply chain and creation of product and service solutions.
 - EMS segment shows explosive growth and is taking on Broader role in driving manufacturing technology requirements.
 - Responsibility of Technology R&D being driven further into supply chain.



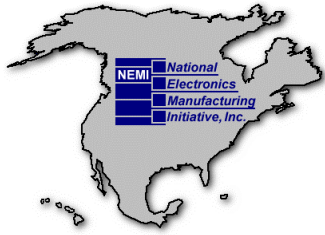
Background (cont.)

- **These shifts will impact how Technology R&D is accomplished:**
 - Fundamental changes to Industry/Academia collaboration
 - » Who is at the table?
 - » What do we focus on?
 - » How is the work organized?
 - Impact of new Business Models (Who pays?)
- **Some confusion exists as to how we should proceed**
 - What are the optimum models in this new environment?
 - Do the success metrics change?
 - How do we insure the ongoing success of our industry?



Goals of Today's Meeting

- **Better Understanding of Today's Industry/Academia Cooperative Landscape**
- **Identification of Key Challenges Facing Industry/Academia R&D Partnerships**
- **Exploration of what can be done to Improve Situation**
 - Industry
 - Academia
 - Government



Agenda

Overview/goals of Session - Jim McElroy, NEMI

**The University perspective - Dr. Rao Tummala, Georgia Tech PRC
Dr. Bahgat Sammakia, Binghamton IEEC**

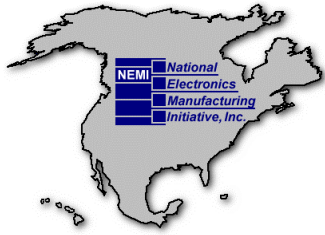
**The EMS Perspective -Dr. Srinivas Rao, Solectron
Mr. John Yealland, Celestica**

**The OEM Perspective -Dr. D.H.R. Sarma, Delphi Delco
Mr. John Stafford, Motorola**

Panel/group discussion

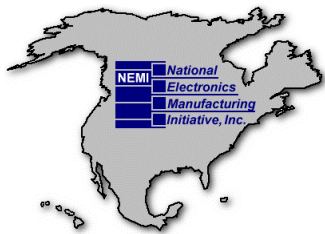
- Identify themes/key issues**
- Propose recommendations/next steps**

Connect with and Strengthen Your Supply Chain



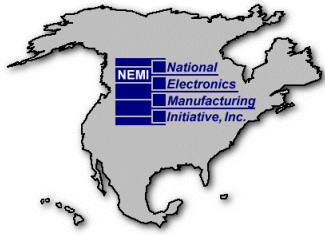
Panel/Group Discussion

- **We want to hear from You!**
- **What do you think about the issues identified?**
- **What are the recurring themes that we heard?**
- **What could we do to improve the overall efficiency of Industrial/Academic R&D Partnerships?**



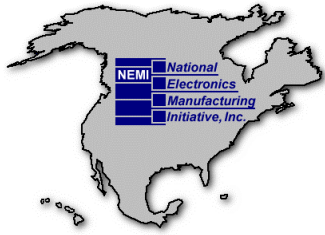
Discussion

- **Focus Industry Voice in Support of Basic (Core) R&D Funding from Government.**
- **Need to Define What is Meant by:**
 - Research
 - Development
- **Set up Academic Internships at EMS Companies.**
- **Set up structured Teams made up of OEM, EMS, and University Participants.**
- **Extract from NEMI Roadmap & Communicate:**
 - Basic Research needs
 - Applied R&D Needs



Discussion (Cont.)

- **One-on-One Relationships (Professor to Engineer) may work better than large Industry/Academic Consortia.**
- **Incubators Could be the Primary Source of Industrial R&D.**
- **Based on this Forum focus on:**
 - What Have we Learned?
 - How Should we Proceed?
- **Put Information from this Session on Web sites:**
 - NEMI
 - IPC
 - Others?



Discussion (Cont.)

- **Need to Understand Industry Role in Working with Universities:**
 - Skills Required
 - Investment of Time
- **Need to Understand OEM & EMS Participation with Universities Over the Continuum From Basic Research to Applied R&D**
 - May Start with High OEM Involvement (Reducing over Time)
 - May Start with Low EMS Involvement (Increasing Over Time)