Executive Summary:
North Carolina Regional Roundtable Table for Talent Development for Additive and Disruptive Technologies in Advanced Manufacturing

I. Evolving Scenario in Advanced Manufacturing

Several factors are accelerating powerful shifts in US manufacturing, including the on-shoring of facilities and operations from Asia, Europe and South America. Attracting manufacturing back home can be linked to reductions in energy costs, access to thriving markets again, and significant effects of technology infusion along the entire value-chain of production.

Breakthroughs in computer engineering, cloud computing, materials, robotics, and a host of other interdisciplinary research activities have led to profound changes in industrial design and processes across every form and sector of manufacturing.

The integration of once independent systems have now converged – biological, electrical, chemical for instance – leading to products never foreseen or considered possible. Rendering of objects in one location, testing and evaluating in another, and producing in yet a third – on a twenty-four hour timeframe – has reduced labor and overhead costs. And increasingly, products that were once the haven of large-scale operations can be generated in garages and small-batch units.

These scenarios, and many more unfolding in the US and abroad, are on a pace for which training, skills and talent development cannot maintain currency. Thus, workforce and education institutions are in a ‘catch-up’ situation unless a new model is developed for identifying, engaging, and creating skills that evolve in real-time, along side the very manufacturing technology tools and platforms that are also evolving.

II. Perspective on Challenges in Workforce, Skills, and Talent Development

- The traditional career development process – from K-12, community-technical-four year institution degree, certification, and continuing education as well as apprenticeship and internship programs – have increasingly been challenged by the creation and adoption of new technologies and processes that transform industry sectors and value-chains – in weeks and months, not years.

- Technology creation and adoption literally is on a trajectory that is often disruptive to not just industries but the entire value-chain of discovery-development-deployment – including industry design and engineering, materials and electronics, process applications and software, manufacturing operations and robotics, and hundreds of other elements in the manufacturing line.

- Additive and disruptive manufacturing, driven by these transformative technologies, places increased emphasis on already pressed skills that demand a combination of highly technical competencies with strong soft-skill capabilities.
• Teams comprised of PhDs and blue-collar shop-floor expertise are forming around the applied and practical execution of advanced manufacturing, and therefore demand new environments for achieving collaborative learning and knowledge-sharing on traditional and emerging sets of competencies and know-how.

• Where such learning and knowledge-sharing occurs is no longer set in the classroom, laboratory, nor trade-craft center; rather the delivery of training and competency building is occurring in entrepreneurial incubators and technology accelerators, on-site facilities and industry consortia ‘testing and evaluation’ programs, and a host of other examples emerging throughout the US based on global best practices.

• Yet, the demands for skills and talent in this period of fast-paced deployment for advanced manufacturing technologies are also sparking changes in education and training tools such as MOOCs, mobile access, cloud computing, and 3D visualization that are creating alternative learning scenarios. The more the focus on what happens on the shop-floor per se, the more the focus will increase for consistent effective and efficient learning that is dynamic, real-time, and a continuous loop of upgrading from success and failure in the application, adoption of technological solutions.

• The range and reach of additive and disruptive technologies for manufacturing includes non-traditional business sectors such as architecture and engineering, industrial design, systems networks and software, and a host of other firms that are not often at the table for these discussions, and now must be participants for the full impact of opportunities.

• Therefore, the expectation that the traditional workforce program delivery can maintain currency with the needs of a competitive additive and disruptive manufacturing sector is unrealistic, and thus requires acceptance of a new intermediary or framework for individuals, companies, industry clusters, communities and regions, and national networks of skills and talent development expertise, delivery, and possibly its own technological platforms.

III. Regional Roundtable - Purpose and Expected Impact

• Capture, inventory, and curate existing initiatives, programs, facilities, training and education locations, and wide range of assets including people, intellectual property, companies, technologies, and ‘systems’ that are engaged in additive and disruptive manufacturing in the Southeast US - and report out initial findings, gaps, and other critical information for Roundtable use;

• Accurately capture the current and evolving skills and workforce demands from leading industry, academic, entrepreneurial interests in additive and disruptive manufacturing

• Map the ‘best-in-class’ skills development and career pathway by defining the ‘perfect state’ rather than seeking to fix the current system and/or debating the already known; gaps and issues from prior gatherings and conferences;

• Identify current barriers and limitations to access talent as required; scale current programs to a broader range of end-users or creation of new programs in the absence of effective programs;
• Identify tools and delivery processes that are necessary to meet demand in a dynamic, just-in-time manufacturing setting;
• Design a framework and the 5-7 critical elements for advanced manufacturing skills development and delivery that operates beyond current systems, boundaries, and borders, as well as the resource requirements for achieving near-term implementation such as public, private, industry consortia, philanthropic, and entrepreneurial investment;
• Outline the key elements of a Regional Action Plan and Performance Road Map that recommends a six, twelve, and eighteen month engagement for accelerating solutions among Fortune 1000 companies, small and medium enterprises, entrepreneurial startups, technology firms and associated R&D and incubator interests, vendor-supplier chains, and other related but specific representatives;
• Identify a future date for follow-up and follow-through including a regional town-hall of broader public and private sector engagement with corporate, civic, government, academic, and economic ‘stewards’ as well as chambers of commerce, technology councils, economic development entities and similar industry consortia, organizations.

IV. National Forum – Purpose and Expected Impact

A subsequent National Forum will be scheduled (in Washington, D.C.) post the completion of some 4-6 Regional Roundtables and documentation. The purpose of the Forum is to engage federal, state, local public sector officials, organizations, and interested parties that are located in Washington including the National Governors Association, the National Association of Manufacturers, National Academies, etc.

The Forum would serve as a ‘Response to the Roundtable’ – to add a relevant nationwide perspective to the findings, insights, recommendations and action-steps identified in North Carolina and the Southeast US, as well as build-upon best practices and solutions from other regions throughout the country.

The Forum would suggest practical, immediate, and sustainable implementation of the proposed Framework and a structure for alliance building among an initial set of 4-8 regions or ‘nodes’ in a network of common interests, challenges, and willingness to collaborate.

Further, pending existing or emerging resource allocations from budgets, pilot projects, and/or the identification of repurposed dollars for implementing the Framework, have Forum participants define a three-year strategic pathway to resolving gaps, instituting recommendations, and scaling progress and performance.

Conduct an initial nationwide asset-mapping of programs, initiatives, pilot projects, facilities and similar efforts to engage around additive and disruptive manufacturing in specific sectors. Identify existing data-sets, information sources, and tools to continue to map and update knowledge sharing in the foreseeable future.
Identify and engage innovators, entrepreneurs, investors, crowdsourcing and other alternative sources of insight, ideas, and accelerated engagement in competitive areas of US manufacturing, and include representatives of these communities in Forum planning and execution, as well as use the Forum for ‘organizing’ disparate and fragmented alternative expertise that is often not aligned with formal events of this type.