

## **Detroit's Transition from "Heavy Metal" to High Tech How Big Things Lead to Small Things**

Feedback sensors, global positioning monitors, carbon nanotubes, fuel cells and MEMS are but a small subset of the list of sophisticated technologies involving R&D in the auto industry. And although most of the news coming from Detroit in recent months has been related to job losses and sinking profits, nanotech opportunities resulting from auto research is just beginning to leap out of the auto world and take hold in various ways throughout the state. A growing list of start-up companies are springing to life in southern Michigan, many in need of technological talent to fuel their growth.

Where has this momentum come from? Michigan is the intellectual capital, and global R&D center, of the automotive industry. Over \$10 billion is invested in R&D annually by the industry, which employs more than 65,000 R&D professionals statewide and is home to over 215 R&D facilities.<sup>1</sup> These numbers translate into Michigan hosting the fourth largest high tech workforce in the nation. These employees are not solely engaged in the physical sciences. In fact, C&E News reported several years ago, that more Chemists were employed by General Motors than many chemical companies.

Worldwide, the nano job market is heating up, according to Small Times magazine, the leading source of news and analysis about the micro and nanotechnology sectors. Small Times conducted a compensation survey<sup>2</sup> of micro and nano professionals that revealed an overall trend in higher compensation and expanding job opportunities. More than 1,300 micro and nano professionals throughout the United States and 36 other countries responded.

Key findings include:

- On a global basis, the average salary in micro and nanotechnology is \$84,605. In the United States, the average salary is \$97,978.
- Expect those numbers to rise: 64 percent of U.S. employees received a raise in 2005, and 75 percent said they expected to receive a raise in 2006.
- Salaries are rising even faster in hot developing countries. For example, although the average micro and nano salary in India is only \$15,850, a full 81 percent expect a raise of more than 5 percent in 2006.
- According to David Forman, Small Times Associate Editor, the data show that employers are putting a premium on technology talent. "Engineers and researchers made, on average, almost \$80,000 a year. But salaries varied significantly by employer type. Component integrators paid on average more than \$94,000 per year while government labs paid considerably less: around \$77,000."

Additional findings include:

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<sup>1</sup> Michigan Economic Development Corp  
<http://www.michigan.org/medc/ttc/AdvancedAutomotive/>

<sup>2</sup> Michigan SmallTech Press Release, Mar 14, 2006  
<http://www.michigansmalltech.com/pressreleases/detail.asp?ContentId=41316C7C-0436-4965-BAD0-B36806A15FC3>

- Employees in micro and nano are highly educated. Globally, 36.7 percent reported a degree at the level of Ph.D., M.D., or J.D., while 29.1 percent reported a master's level degree.
- Those who earn the most in the micro and nanotechnology fields were partners in legal services firms in the United States.
- Those earning the least were researchers in Asia, the Middle East and Eastern Europe.

Michigan is clearly front and center in the nation's overall growth in this area. Small Times annual survey identified Michigan as one of 6 states to watch as a "small tech hot spot." In the publication's 2006 survey, Michigan moved from #5 to #4 overall for its small tech industry, as measured by: Research, Industry, Venture capital, Innovation, Workforce and Costs.<sup>3</sup>

Contributing to this ranking is the state's academic institutions. The University of Michigan is one of the top three universities in the nation, based on its nanotechnology programs.<sup>4</sup> Dating back to 2000, the school received \$60 million in grants to pursue research in MEMS. In addition, Central Michigan University, in Mount Pleasant, MI, on December 8, 2006 officially opened a 17,000 sq ft expansion of its nanotechnology center called The Center for Applied Research and Technology (CART). This addition will house the National Dendrimer Center, 17 labs and 1 biosafety level 2 lab. Chemists at Michigan State University are conducting research on polymer nanocomposites, aimed at making polymers more cost-effective and nanoporous materials, used in cleaning contaminated water and reducing industrial waste. Michigan Technological University, in the Upper Peninsula, has partnered with Louisiana Tech to develop a micro measurement system to assist doctors trace and treat cardiovascular disease. In 2003, Wayne State University (WSU) partnered with Delphi Corp to open a 4,000 sq foot clean room for MEMS R&D. This facility is part of WSU's Smart Sensors Lab, which is developing technologies for automotive and medical applications.<sup>5</sup>

Good coordination between government, academia and industry is essential for capturing opportunities in this sector, and Michigan has not lost sight of that fact. In 2003, Michigan's Small Business and Technology Development Center network was one of only two groups in the U.S. to be awarded the prestigious national technology designation from the U.S. Small Business Administration. In order to earn this recognition, the statewide network had to demonstrate a strong commitment to the allocation of both human and financial resources to serve small businesses which focus on technology.<sup>6</sup> The state has also developed "SmartZones," encouraging commercialization and academic collaboration. Currently there are 11 zones across the state, each with a specific high-tech focus and major university or research institution affiliate. Nine of the SmartZone have incubators, and six of those have added business accelerator services. These include research staff, wet lab space and internet connectivity to nurture high-tech startups. Through 2004, over 24 companies had located within a SmartZone resulting in \$120 million in private investment.

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<sup>3</sup> [http://www.smalltimes.com/display\\_article/281856/109/ARTCL/none/none/State-Rankings/](http://www.smalltimes.com/display_article/281856/109/ARTCL/none/none/State-Rankings/)

<sup>4</sup> Michigan SmallTech Press Release, May 22, 06

<http://www.michigansmalltech.com/PressReleases/detail.asp?ContentId=6985EC7F-4DFB-440A-A593-01D62E1C84C0>

<sup>5</sup> "Michigan: The Emerging Small Tech Leader"  
Small Times Media Supplement

<sup>6</sup> "Michigan: The Emerging Small Tech Leader"  
Small Times Media Supplement

The skill sets needed for companies in this arena are diverse and varied. Those with a cross of life and physical science education and experience are highly coveted. Engineers are of course needed, which makes the state fertile grounds for start-ups, as many ex-auto engineers are looking to apply their skills in new ways. An entrepreneurial spirit, and the ability to collaborate across industries, is what employers are seeking as soft-skills.

So consider Michigan as a career option if you enjoy change: changing seasons, changing economy and changing the world for the better through technology.