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Attracting, Developing & Retaining Automotive Talent in Michigan

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CAR Industry Briefing

23 June 2015

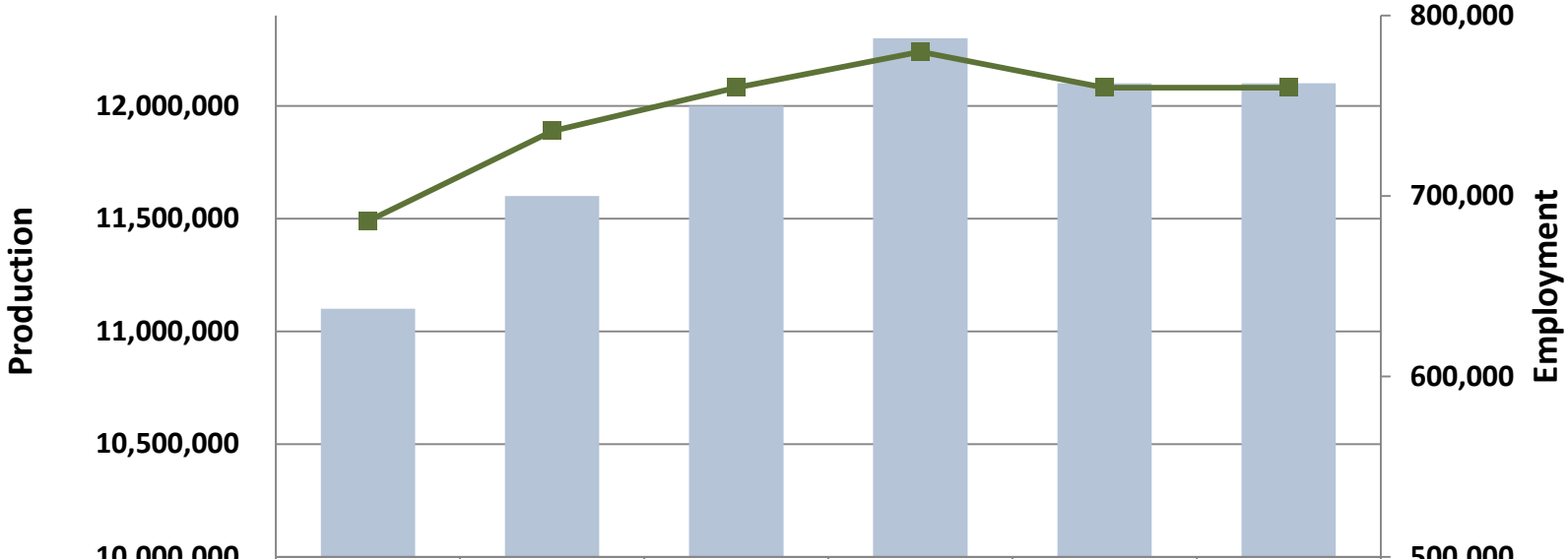
The Research

- Attracting & retaining world-class talent is one of the three main pillars of the MEDC Automotive Strategic Plan
- CAR examined automotive industry talent needs for:
  - Engineers
  - Technicians
  - Designers
  - Software Developers
  - Skilled Trades
  - Production
- The needs were related to five areas of technological change:
  - Connected & automated vehicles
  - Lightweight & multi-material vehicles
  - Powertrain & propulsion
  - Advanced manufacturing systems
  - Supply chain & logistics
- We looked two, five & ten years out at:
  - Anticipated hiring & attrition
  - Organizational hiring & training practices
  - Required knowledge & skills
  - Desired education & training

Methodology

- One-on-one structured interviews and data collection:
  - Five automakers, representing 63% of U.S. sales (including the four largest in North America)
  - Eight automotive suppliers, representing over $36 Billion in North American OE sales
  - Four emerging technology companies
  - Engineering hiring managers, HR executives, technical leads
- Literature review
- Data
  - Proprietary CAR databases
  - Proprietary company data
  - State & Federal government data
  - Commercially-available data

U.S. Vehicle Production & Automotive Employment Forecasts: 2015-2018



	2013	2014	2015	2016	2017	2018
Vehicle Production	11,100,000	11,600,000	12,000,000	12,300,000	12,100,000	12,100,000
Automotive Employment	686,100	736,000	760,000	780,000	760,000	760,000

Source: Automotive News; Center for Automotive Research; BLS

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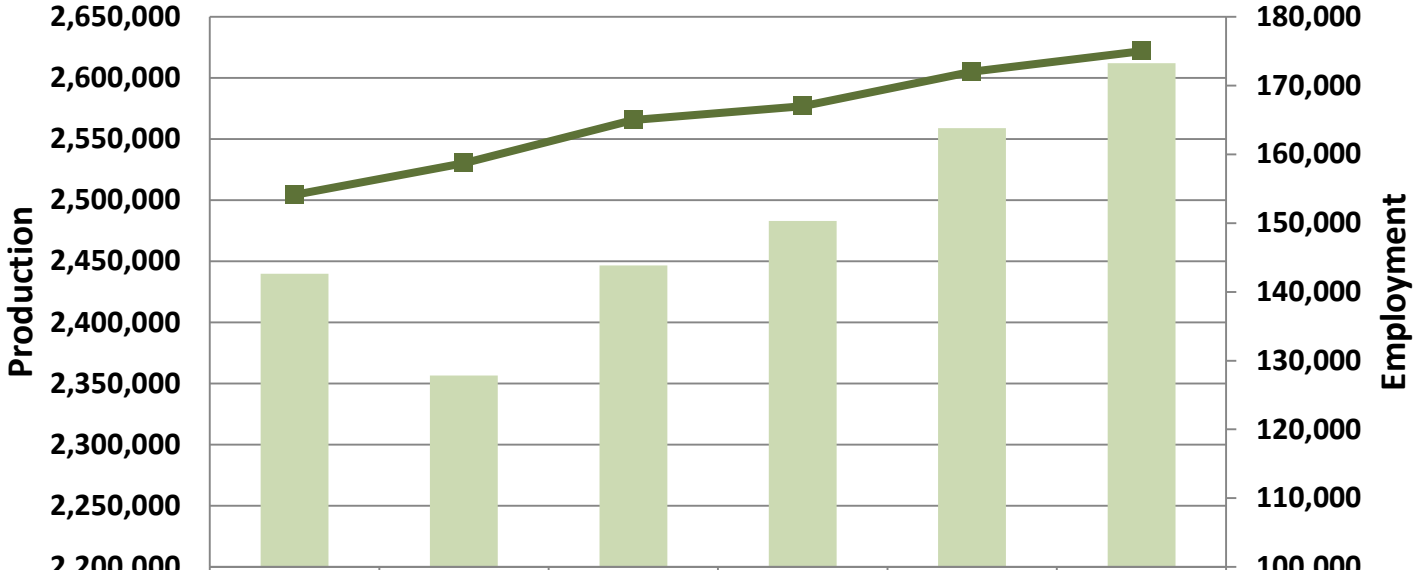
Michigan Vehicle Production & Automotive Employment Forecasts: 2013 – 2018



	2013	2014	2015	2016	2017	2018
Vehicle Production	2,439,819	2,356,510	2,446,588	2,483,121	2,558,863	2,611,947
Automotive Employment	154,100	158,700	165,000	167,000	172,000	175,000

Source: LMC-Automotive; BLS; Center for Automotive Research

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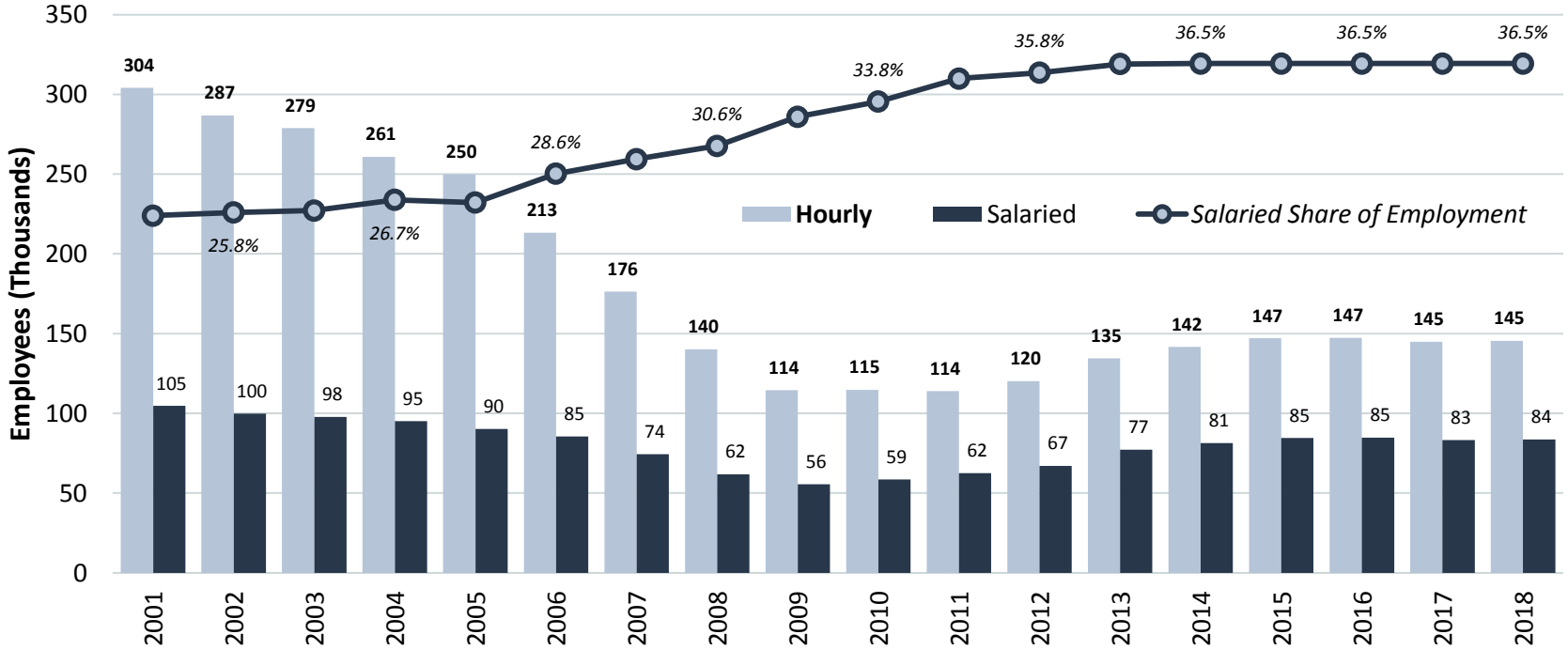
FCA, Ford & GM Total U.S. Employment 2001 – 2018



Source: Center for Automotive Research

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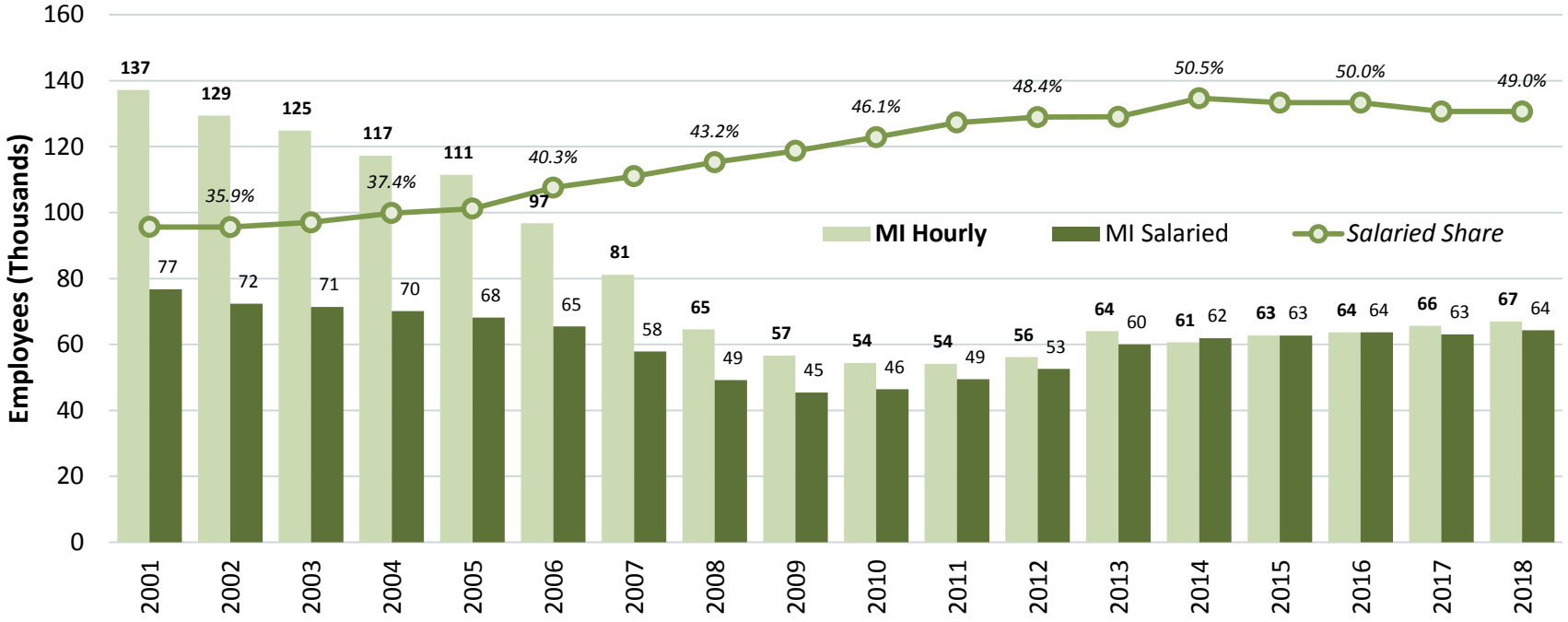
FCA, Ford & GM Total Michigan Employment 2001 – 2018



Source: Center for Automotive Research

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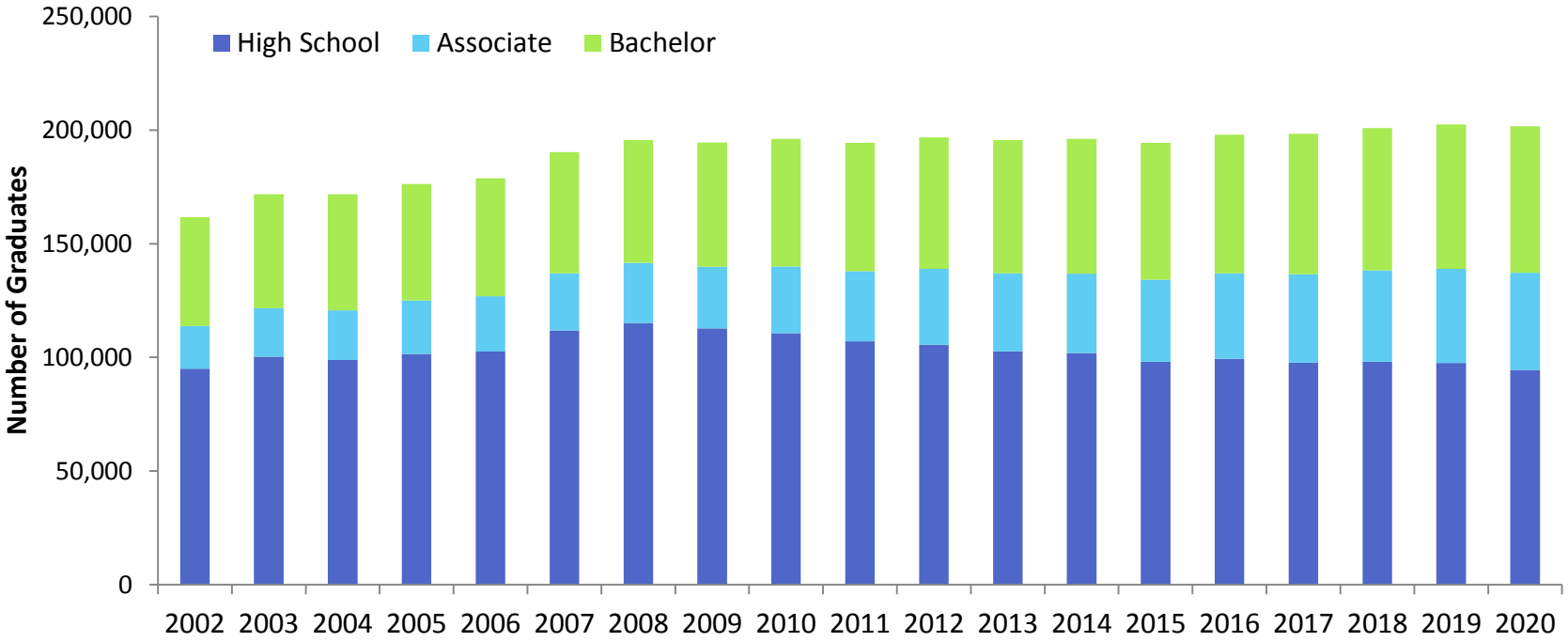
Students Graduating from Michigan Schools 2002-2020



Source: National Center for Education Statistics (NCES) and Center for Automotive Research estimates 2015

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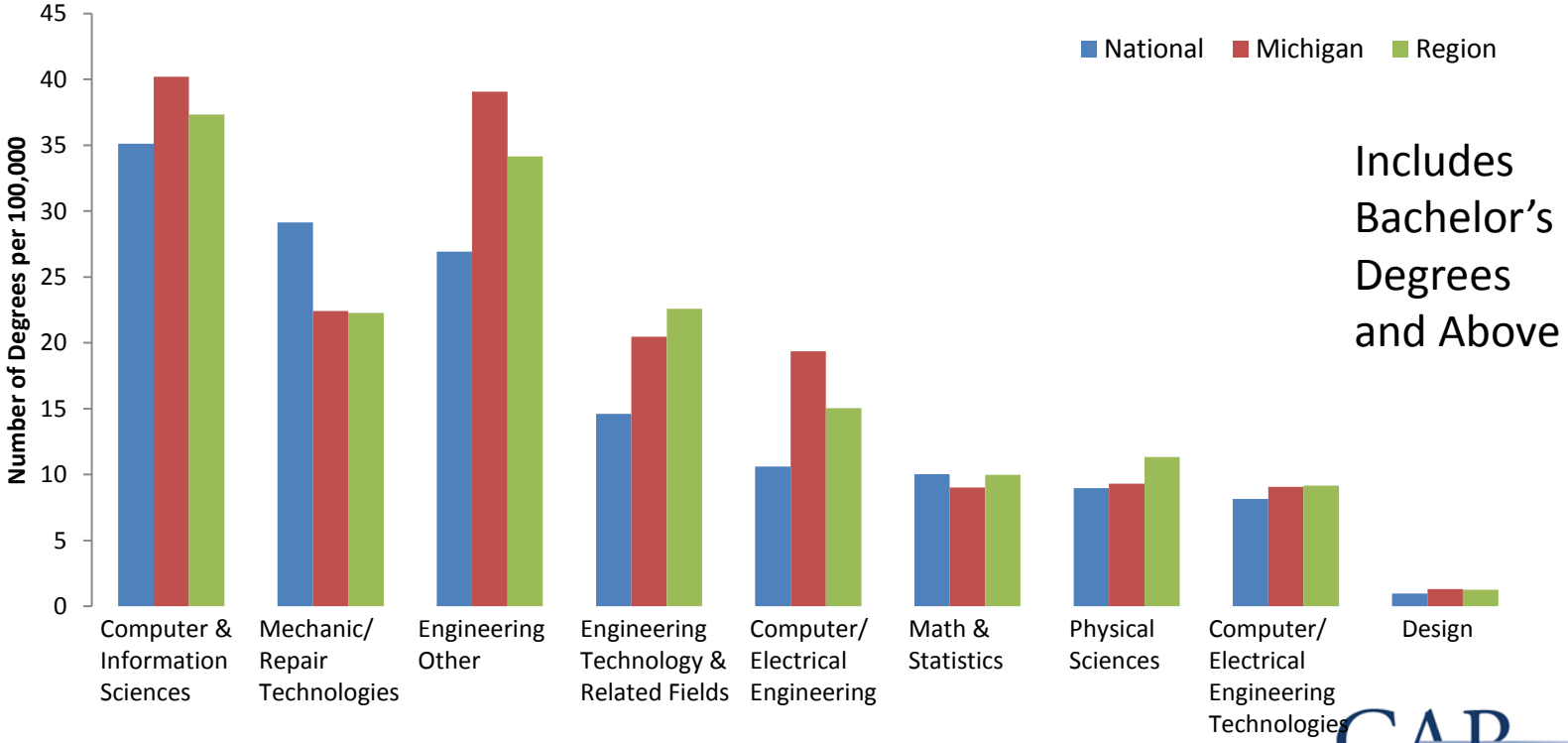
Automotive Related Degree Completions per 100,000 (2011-2012)



Source: National Center for Education Statistics

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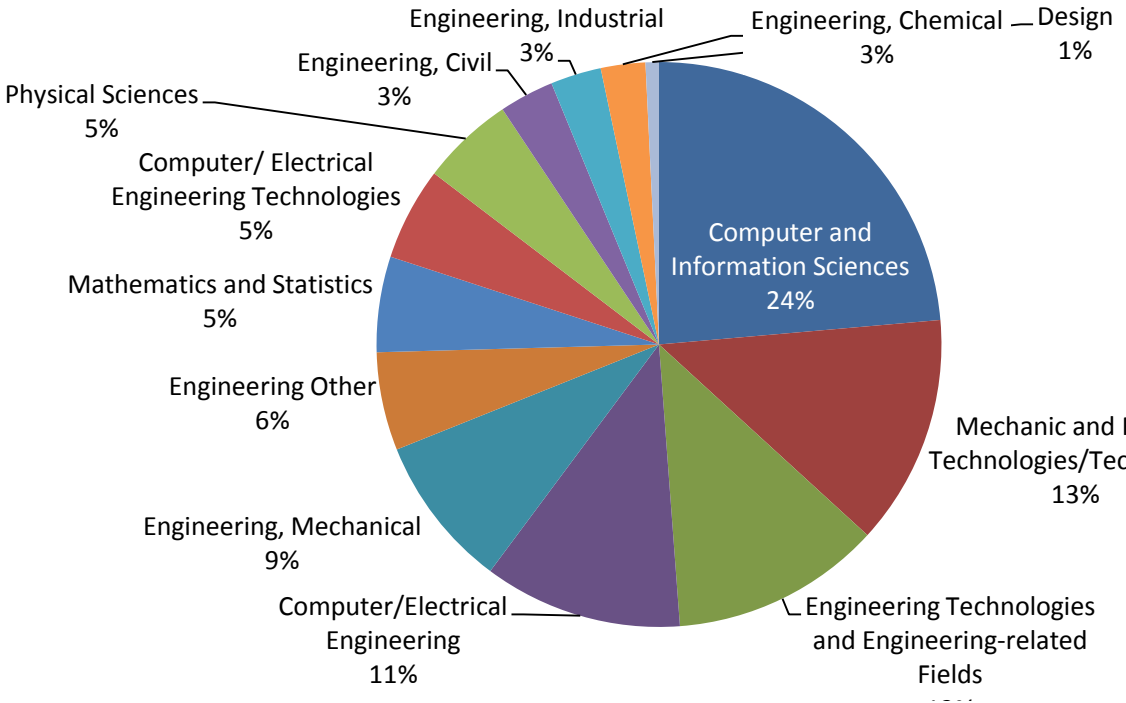
Automotive Related Degree Completions in Michigan by Category, 2011-2012



Includes Bachelor's Degrees and Above

Source: National Center for Education Statistics (NCES) and Center for Automotive Research estimates 2015

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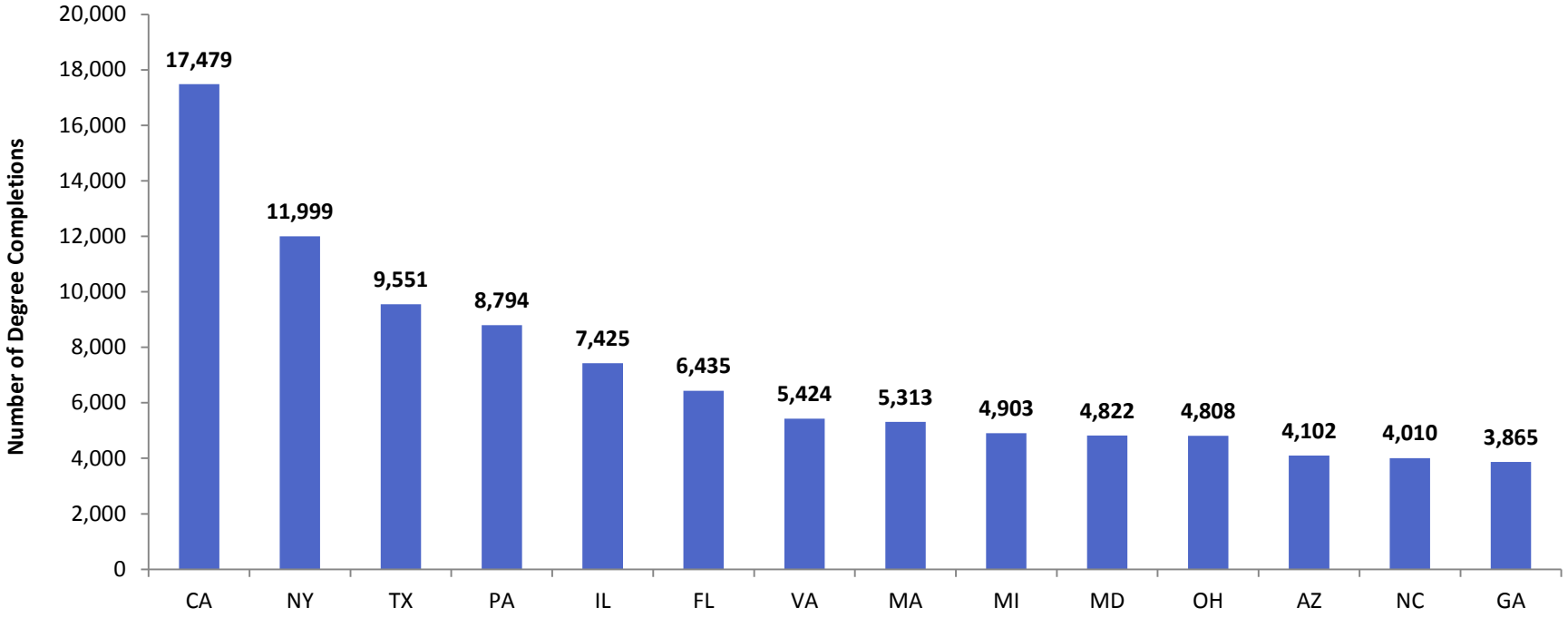
Top States with CAV Related Degree Completions (Bachelor or Higher) in 2011-2012



Source: National Center for Education Statistics

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The Challenge to Find Talent

- Plenty of applicants; but applicants with the desired skills are hard to find
- Difficulty filling positions
  - Only 40% of positions filled in the last 12 months
  - 80 day average per position—about 20-35 days “too long”
- 80% of respondents have difficulty finding talent in the region
  - 50% say talent is hard to find anywhere
  - So, moving the job to another location is not always a solution
- Suppliers are competing with their customers for talent

Source: Center for Automotive Research interviews with automakers & supplier executives

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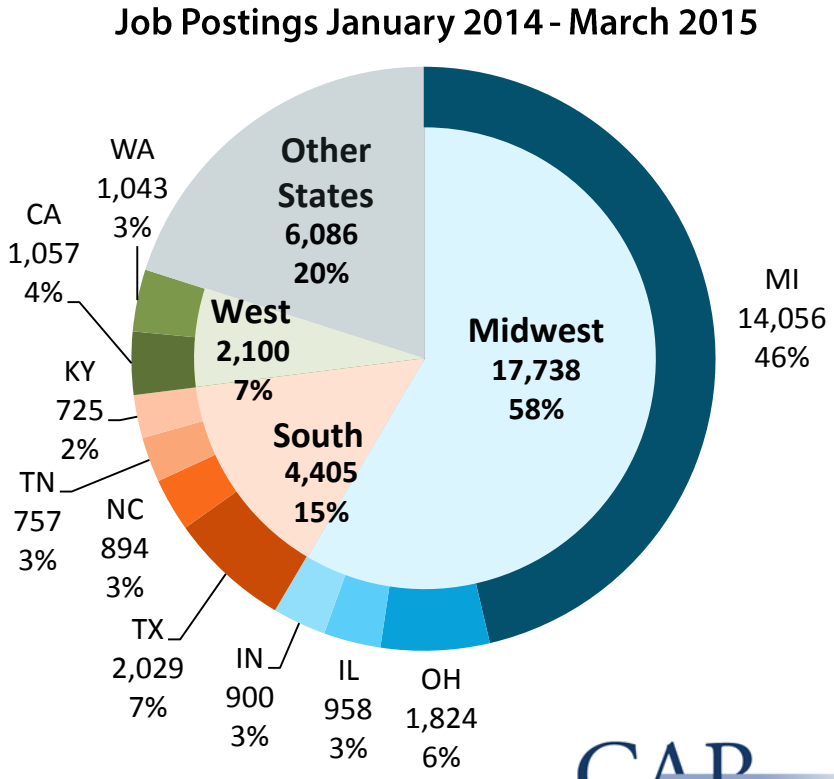
Recent Auto Industry Hiring by State/Region

- Over 30,000 job postings in 15 months
- Nearly half of all jobs posted are located in Michigan (in line with historical trends)
- Job postings are not 1-to-1 related to positions hired



Source: Labor/Insight Jobs

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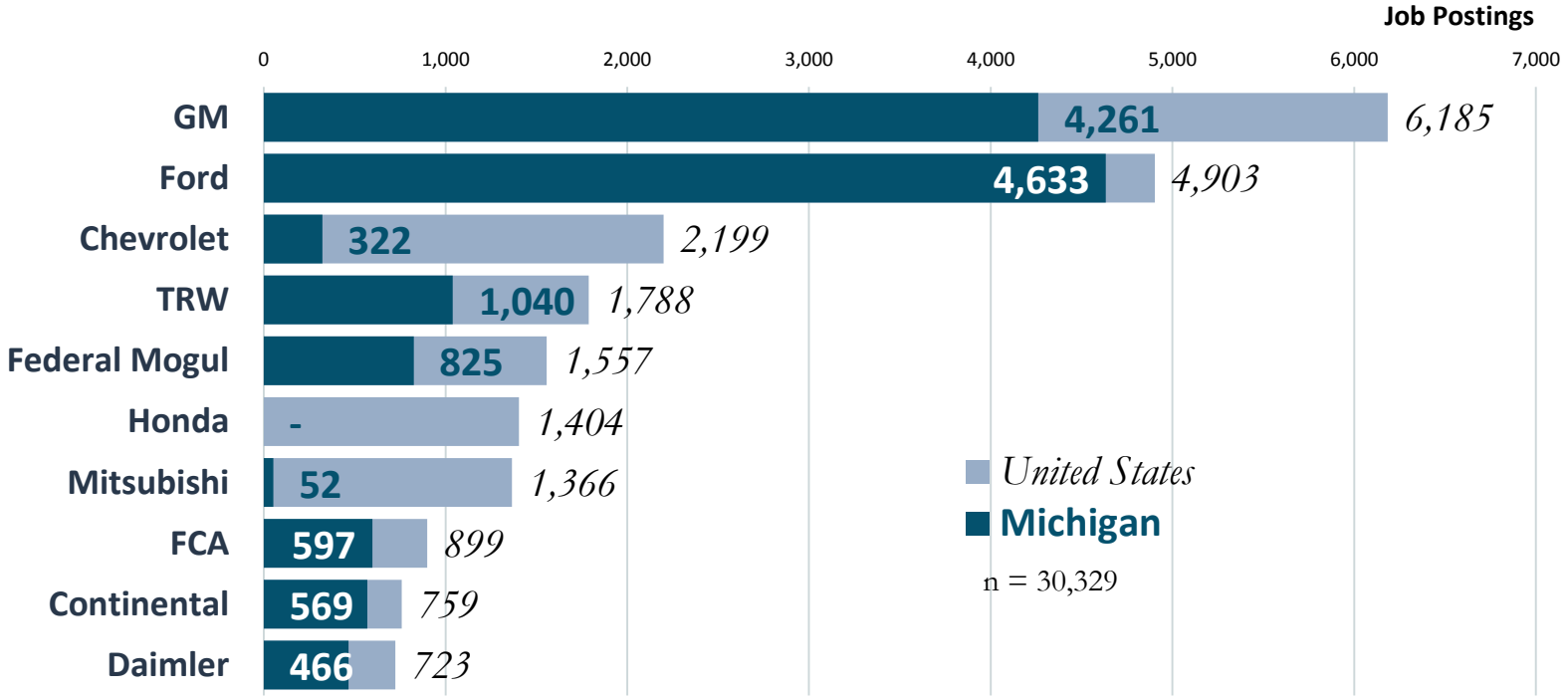
Top Employers in the United States and Michigan

Auto and Parts Manufacturing Jobs (by postings): January 1, 2014 – 2015 YTD



Source: Labor/Insight Jobs

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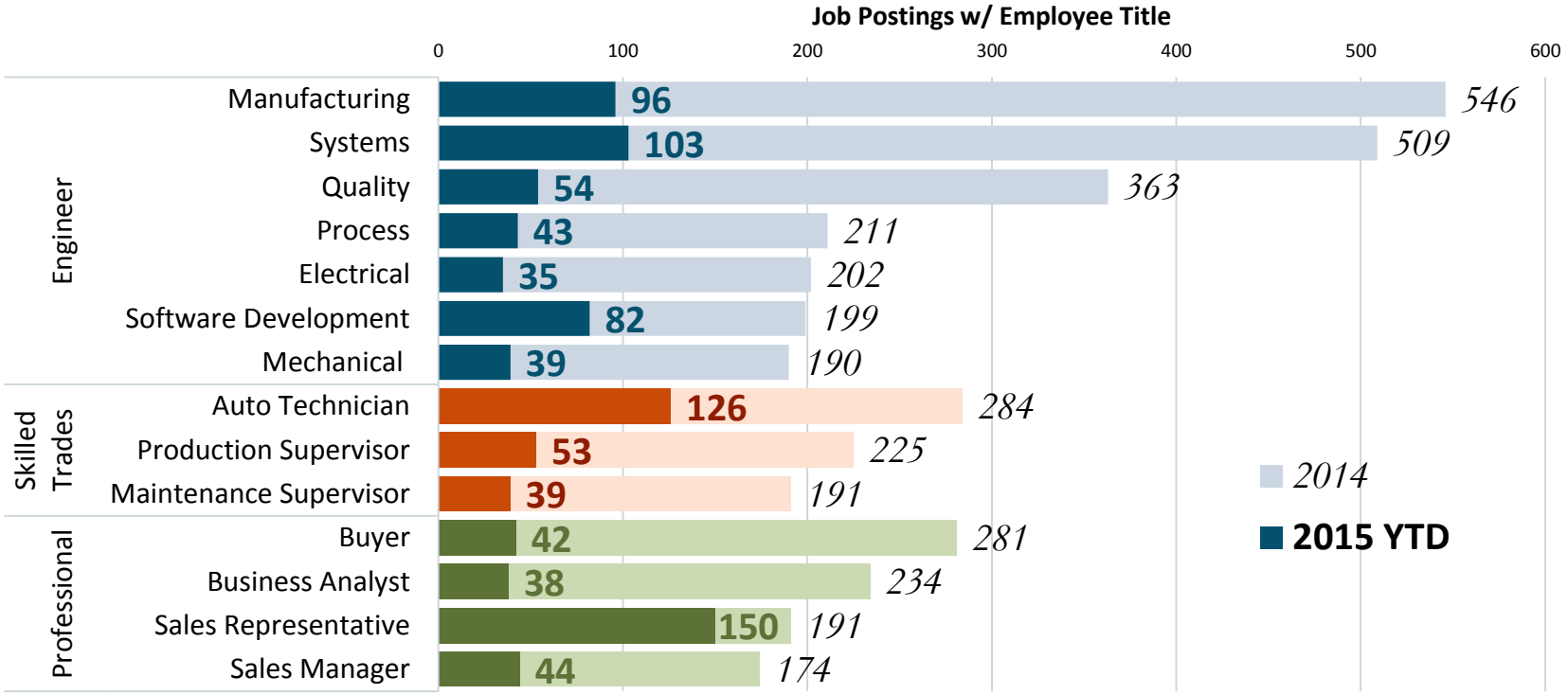
Top Job Titles

Auto and Parts Manufacturing Jobs (by postings) in the United States: 2014 and 2015 YTD



Source: Labor/Insight Jobs

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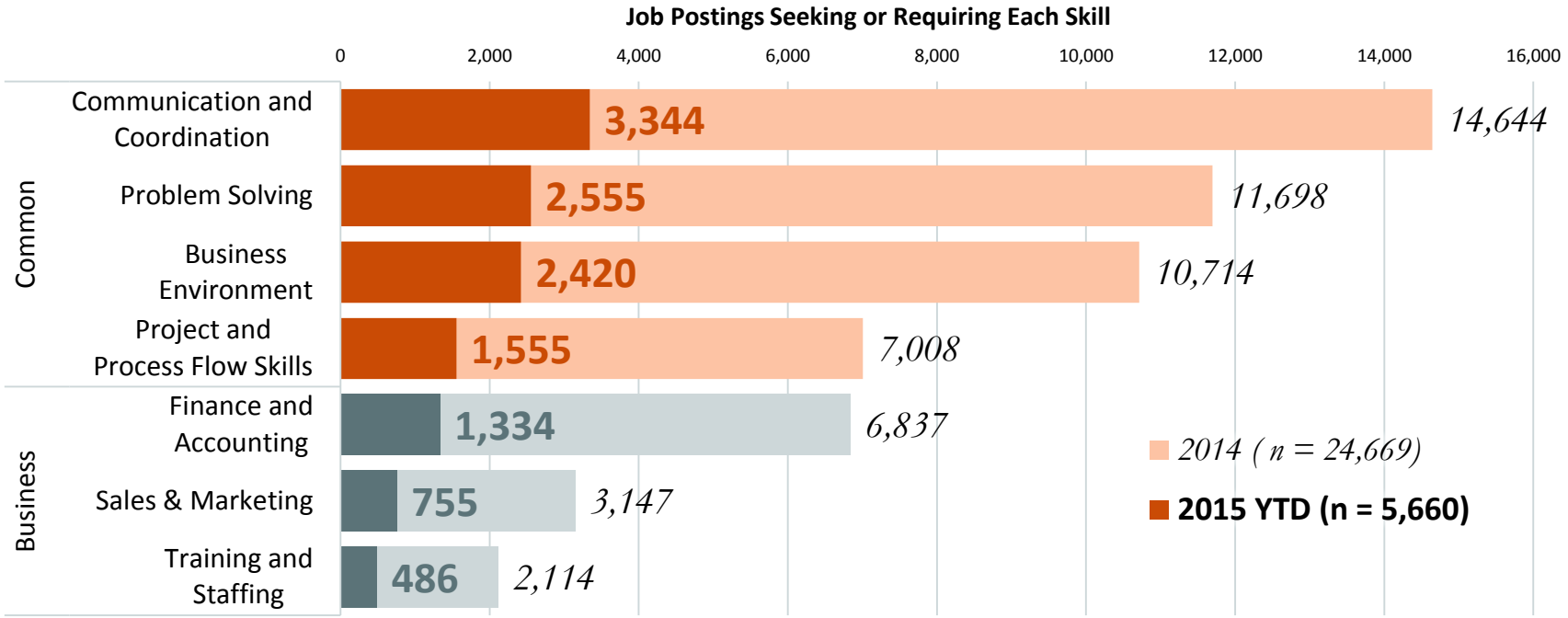
Skills Demand in Auto and Parts Manufacturing

Business and Common Skills: 2014 and Q1 2015



Source: Labor/Insight Jobs

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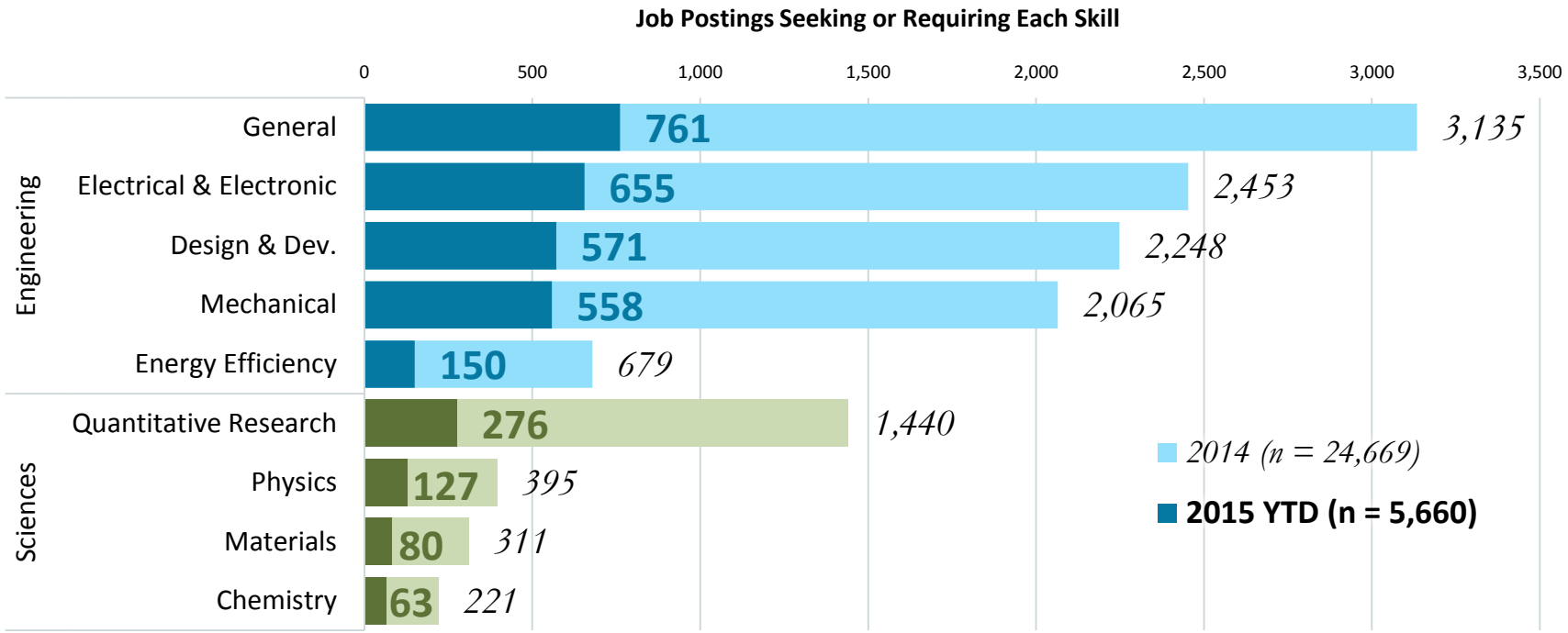
Skills Demand in Auto and Parts Manufacturing

Engineering and Sciences: 2014 and 2015 YTD



Source: Labor/Insight Jobs

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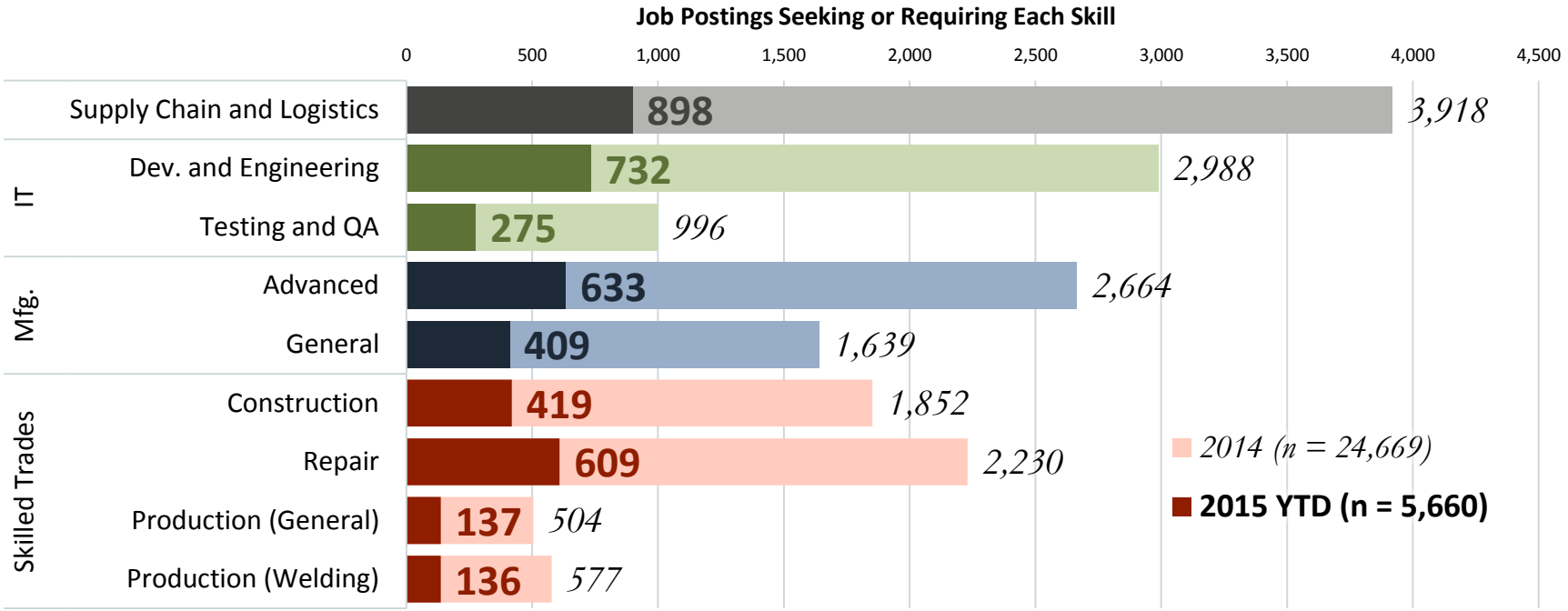
Skills Demand in Auto and Parts Manufacturing

IT, Manufacturing, and Skilled Trades: 2014 and 2015 YTD



Source: Labor/Insight Jobs

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Skills in Demand in the CAV Space

- Electrical Engineering
- Computer Science/Software Engineering
- Mathematics—geometry, algorithms
- Mechanical Engineering
- Hardware testing/calibration
- Supply Chain Management/Logistics

- Software Skills:
  - Embedded automotive software (including RTOS such as ThreadX and QNX)
  - Agile development
  - Linux—becoming the basis for infotainment and instrument cluster
  - Network protocols
- Hardware Skills:
  - Higher-level VHDL (VHSIC Hardware Description Language)
  - VLSI (Very Large Scale Integration)
  - SPGA (Staggered Pin Grid Array)

Source: Center for Automotive Research interviews with automakers & supplier executives

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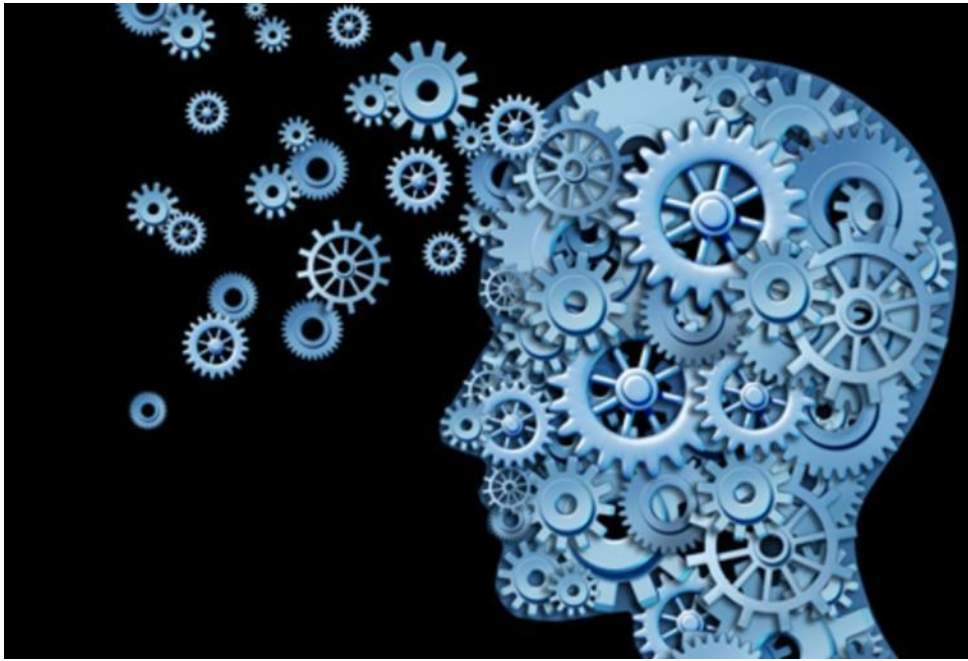
Engineering Fields Dominate the Job *Titles*, but the Most Sought-After *Skills* are Non-Technical



The overwhelming demand is for technical skills PLUS:

- Communication
- Coordination
- Problem Solving
- Project & Process Flow
- Language Skills & Cross-Cultural Communication

Source: Center for Automotive Research interviews with automakers & supplier executives

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Where do Employees Learn These “Soft Skills”?

1. Co-ops and Internships
2. Extracurricular teams
3. Experiential learning
4. Academic coursework
5. On the job

Source: Center for Automotive Research interviews with automakers & supplier executives

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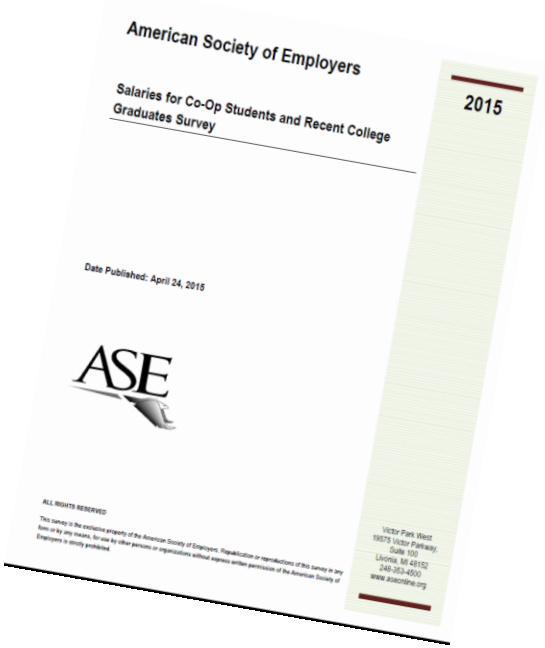
Not All Auto Suppliers Have Formal Co-op/Internship Programs.

- 88% of auto supplier have a co-op/ internship program
- Mostly hire undergraduates and advanced degree students, but some work with high school juniors & seniors
- Only 57% of auto suppliers surveyed have a formal program



Source: American Society of Employers

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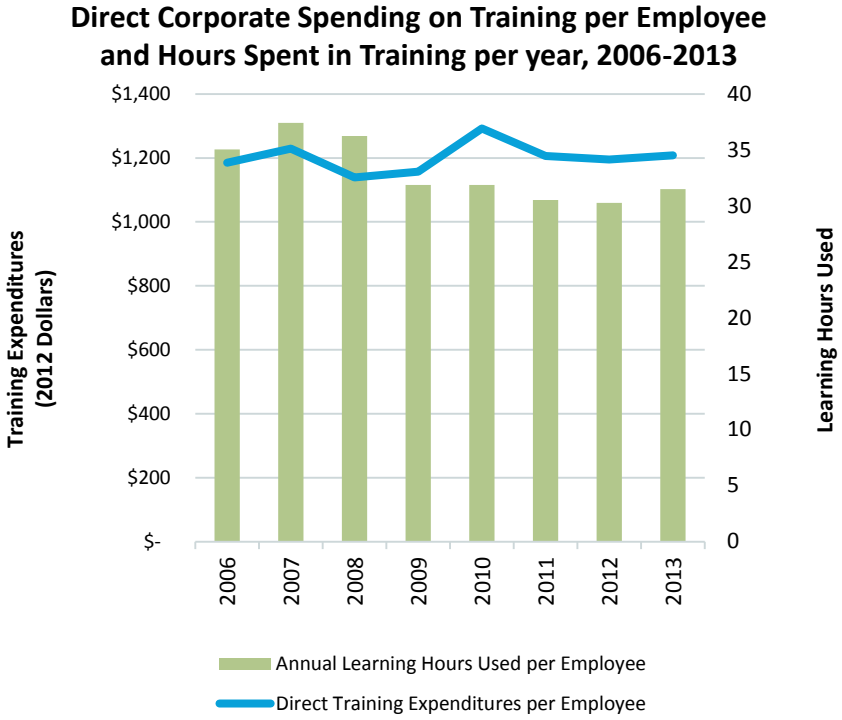
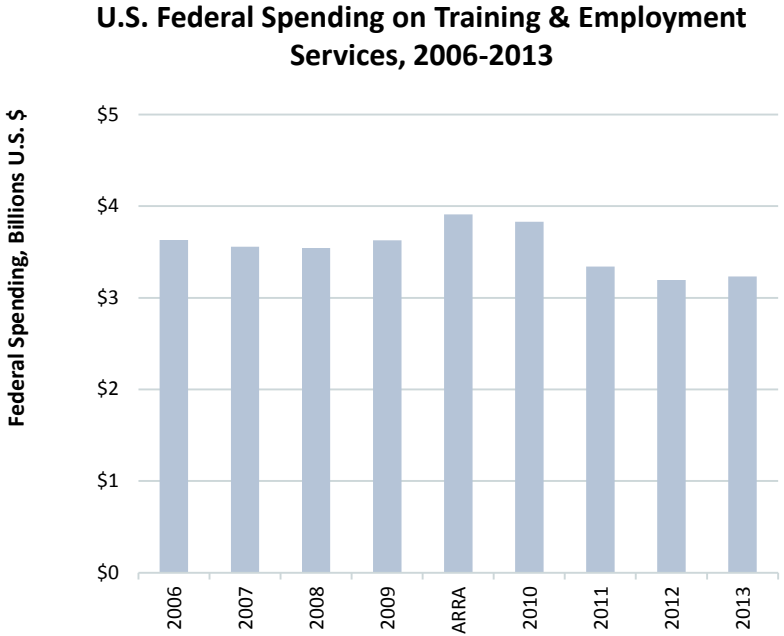
Private & Public Spending on Job Training is Not Growing; Hours of Training/Year Remain Flat





Sources: ASTD 2014 State of the Industry Report; Budget of the United States, Table 9.1

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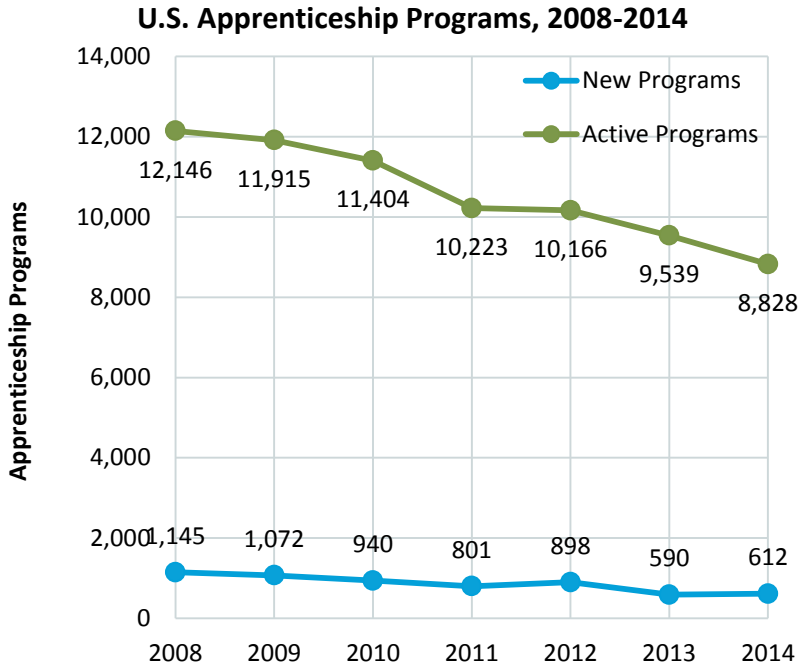
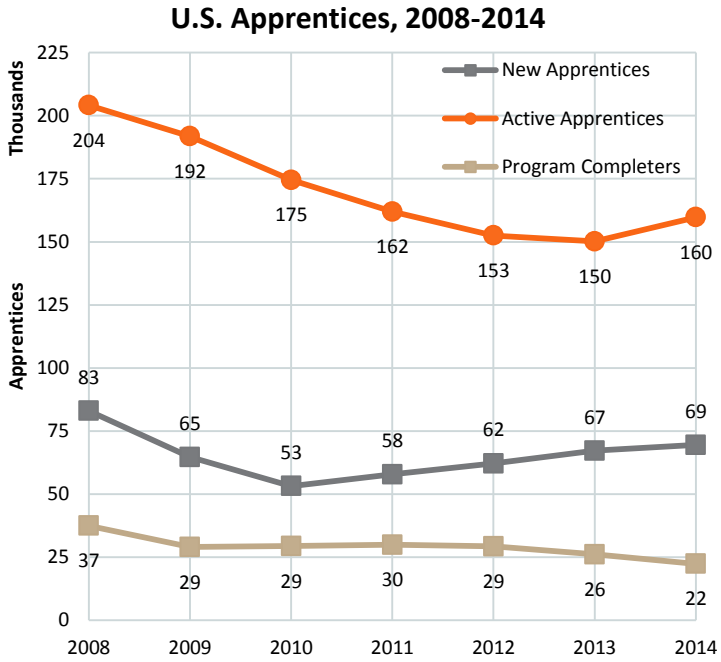
Number of Apprentice Programs has been Falling; The Number of Active Apprentices Grew in 2014





Source: U.S. Department of Labor, Bureau of Labor Statistics

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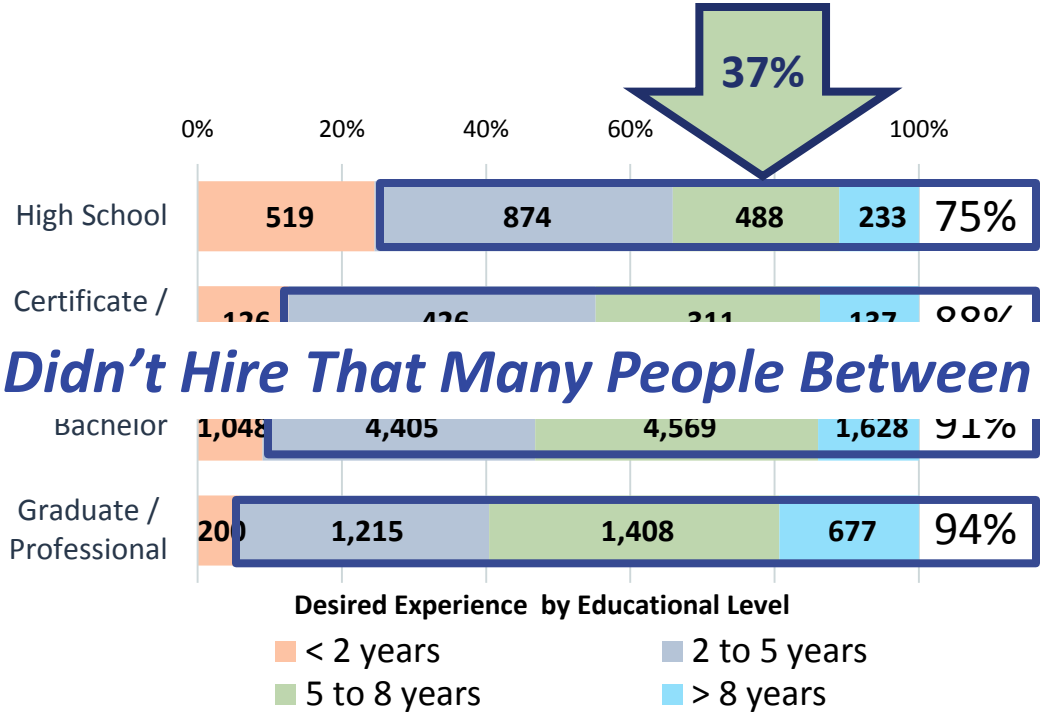
Experienced Hires are in High Demand.



The Industry Didn't Hire That Many People Between 2007-2010

Source: Labor/Insight Jobs

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Employers Report Very Little Pressure to Raise Wages for Engineering/Technical Hires

- Despite a “shortage” of candidates, a vast majority of employers we interviewed report little or no upward wage pressure…with a few notable exceptions:
  - Embedded systems
  - Software/hardware integration
  - HMI design
  - Candidates with experience (acquired through employment and/or experiential learning)
- Competition is not all in Michigan, United States, or North America, so salaries must be in-line with employees in other countries

Source: Center for Automotive Research interviews with automakers & supplier executives

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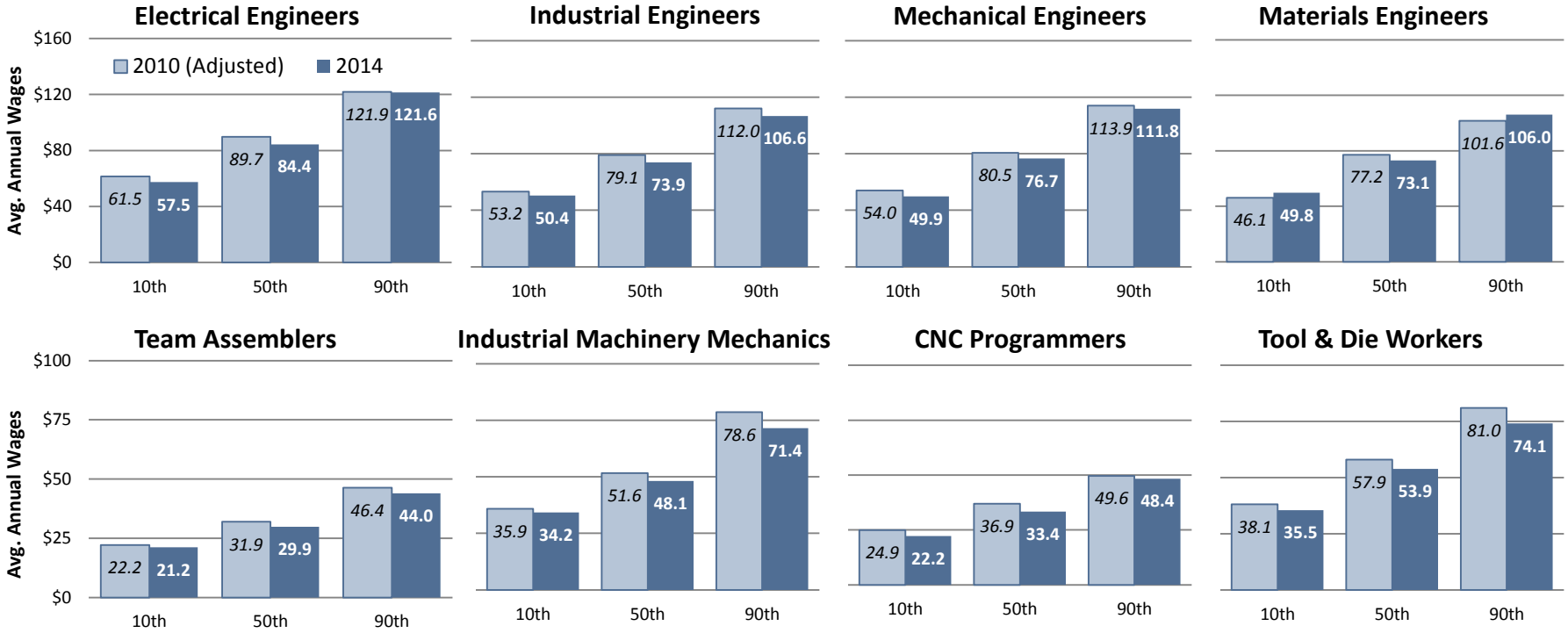
Wage Comparisons Charts, Selected Occupations in U.S. Motor Vehicle & Parts Manufacturing, 2010 and 2014



Source: U.S. Department of Labor, BLS and U.S. Department of Commerce, Bureau of the Census, Current Population Survey

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Employers Report a Shortage of Qualified Candidates, but Little to No Upward Wage Pressure. Something has got to give.

Source: Center for Automotive Research

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