

# ***Economic Benefits of Government Investments in Engineering***



***Richard B. Brown***



# Engineering Initiative Background



Gov. Michael Leavitt



Olene Walker



John Warnock



Jon Huntsman



Gary Herbert





# 2001 Utah Senate Bill 61

- *Increase the number of engineering and computer science graduates to advance the “well being of the State and its citizens.”*
- *Improve the quality of instructional programs*
  - *Faculty*
  - *Programs*
  - *Capital facilities*
  - *Equipment*
- *Broad Political Support*
- *Matching On-Going Funds*
- *Tech. Initiative Adv. Board*





# *State Engineering Initiative Support*

<b><i>FY</i></b>	<b><i>On-Going</i></b>	<b><i>One-Time</i></b>
2002	\$1,000,000	\$2,500,000
2003	2,000,000	1,000,000
2004	500,000	
2005	500,000	500,000
2006	1,500,000	500,000
2007	500,000	700,000
2008	3,000,000	2,000,000
2009		250,000
2010		2,000,000
2011		
2012	2,500,000	
2013		
2014		
2015	3,500,000	1,000,000
<b><i>Total</i></b>	<b><i>\$244,000,000</i></b>	<b><i>\$10,450,000</i></b>



# *U of U Engineering Initiative Support*

<b><i>FY</i></b>	<b><i>On-Going</i></b>	<b><i>One-Time</i></b>
2002	\$466,667	\$933,333
2003	800,000	300,000
2004	180,000	
2005	207,000	175,000
2006	680,000	277,000
2007	250,000	350,000
2008	1,400,000	800,000
2009		46,000
2010		920,000
2011		
2012	1,186,000	
2013		
2014		
2015	1,800,000	500,000
<b><i>Total</i></b>	<b><i>\$6,969,667</i></b>	<b><i>\$4,301,333</i></b>

Equivalent to a  
\$350M Endowment



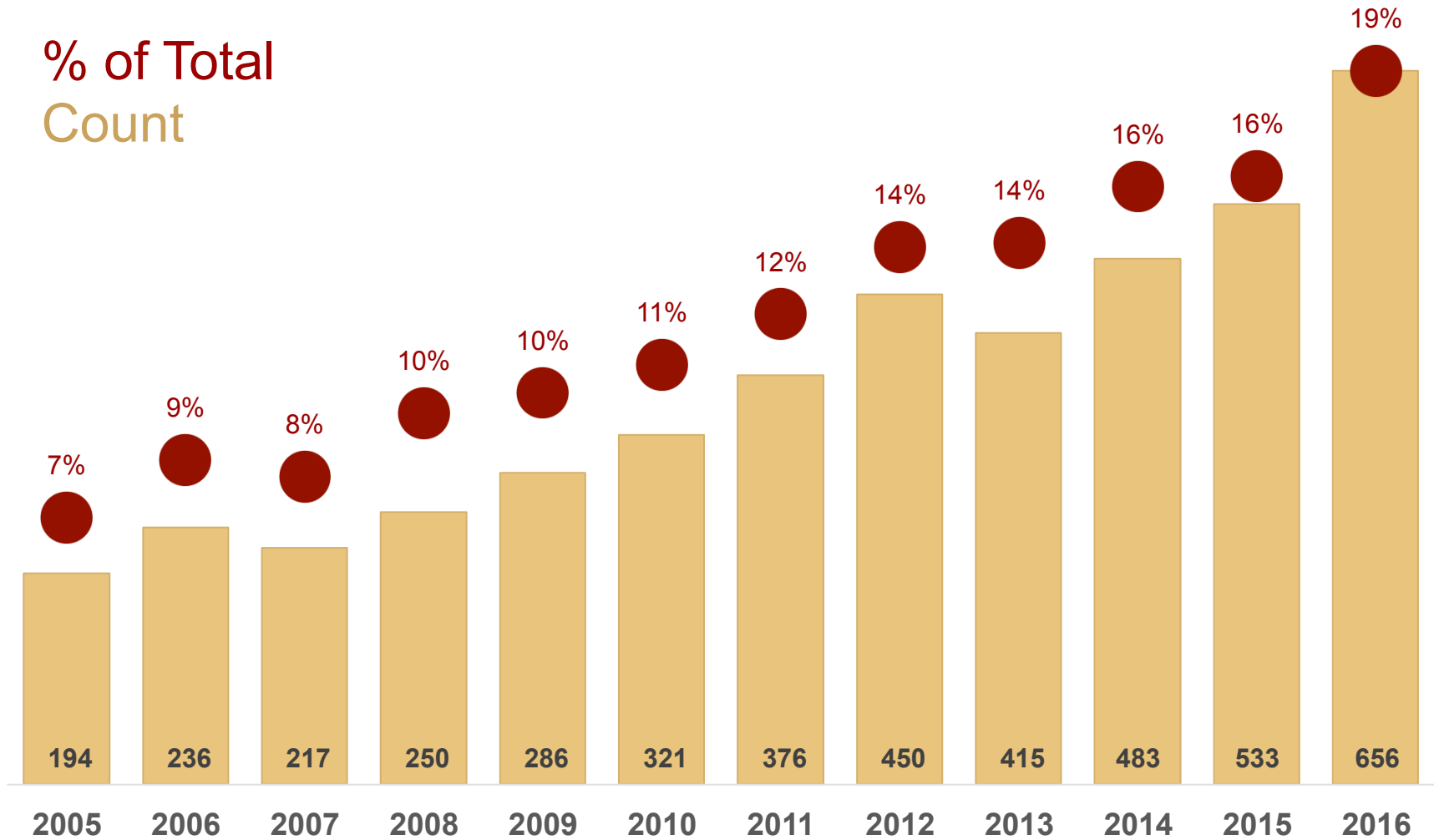
# *Warnock Engineering Bldg.*





# Engineering Freshman Enrollment

% of Total  
Count







# High School Engineering Classes

- *Stacy Firth*
- *Olympus High*
- *Granite District*
- *Whole State*
- *Introduction to Engineering*
- *Fundamentals of Computer Science*
- *Engineering Design (Sr. Capstone)*







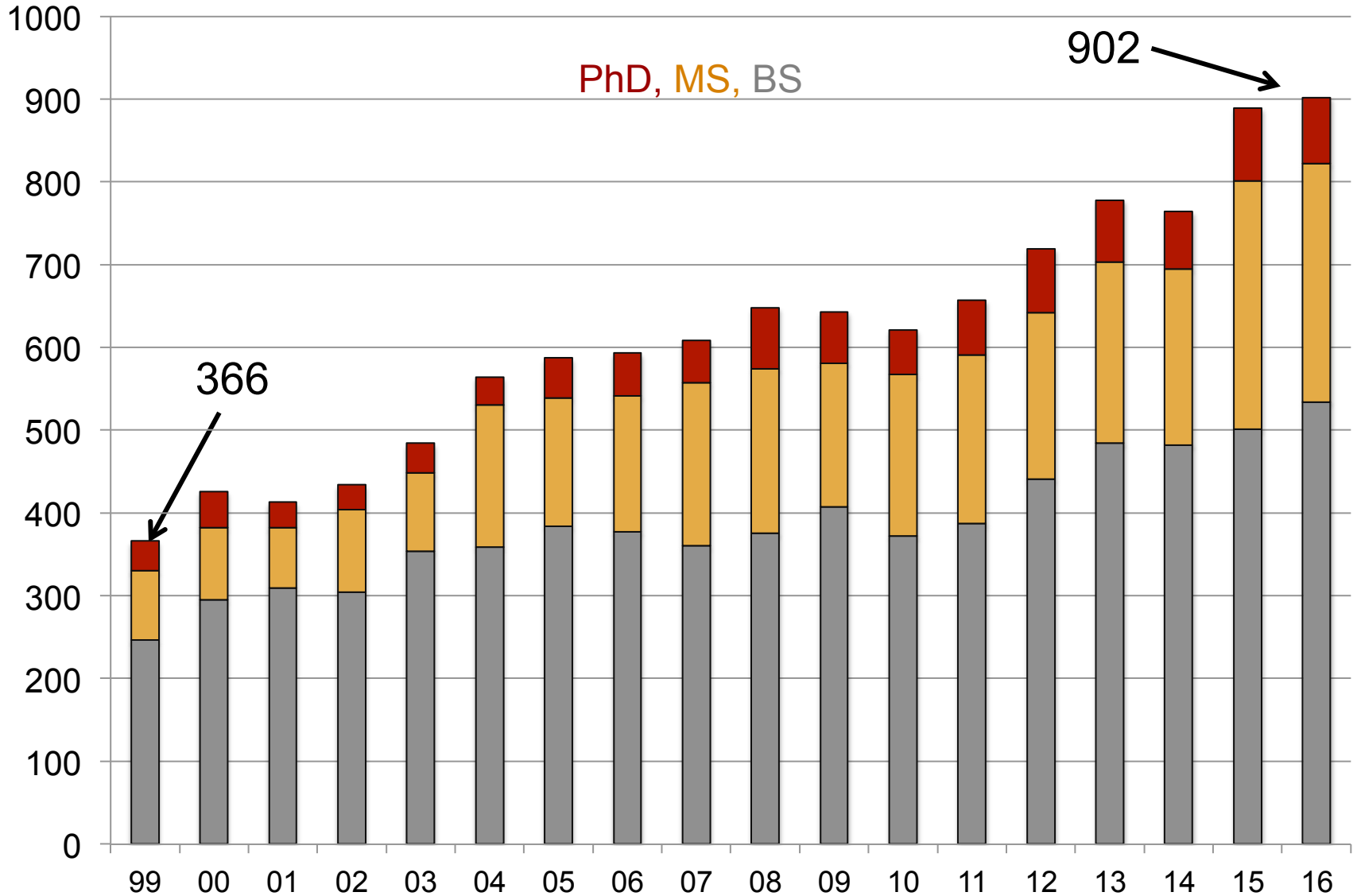
# Freshmen Demographics, 2004 to 2016

- *Domestic Freshmen of Color* 10% to 31%
- *Domestic Female Freshmen* 11% to 25%
- *Out of State Domestic Freshmen* 15% to 33%
- *Ave. ACT up 2 points*
- *Direct Admit Students Up*



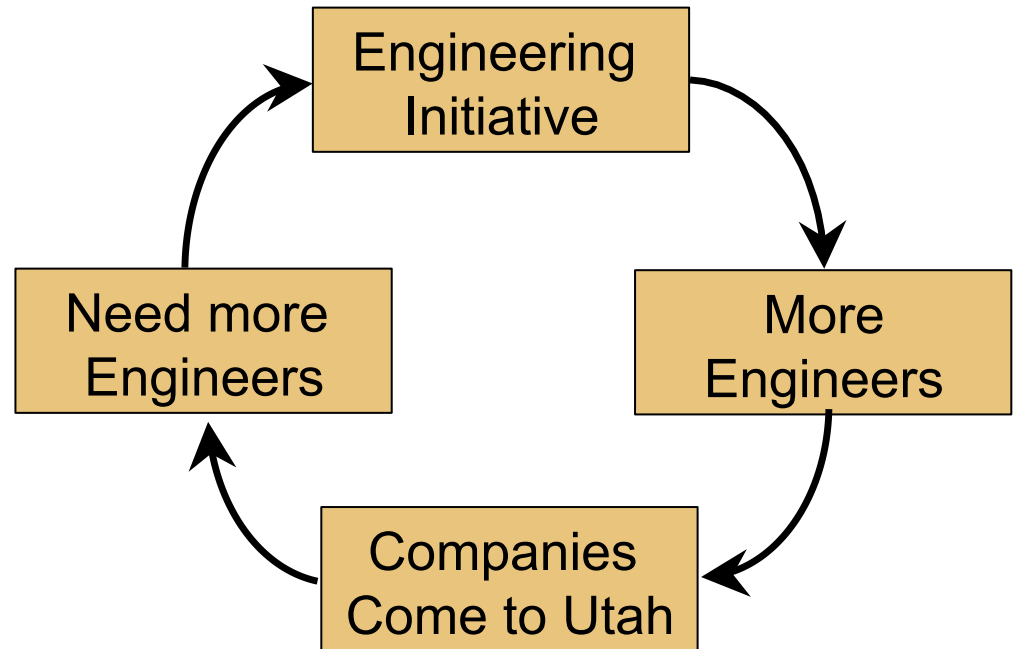


# Engineering Degrees Granted





# Engineering Initiative



- *Promised 250 more graduates*
- *Produced 657 more per year*



# USTAR

- *Stimulate economic development in Utah*
- *Recruit world-class researchers*
- *Build state-of-the-art interdisciplinary research facilities*







# *New Nanofab*





# USTAR Microscopy Core Facility



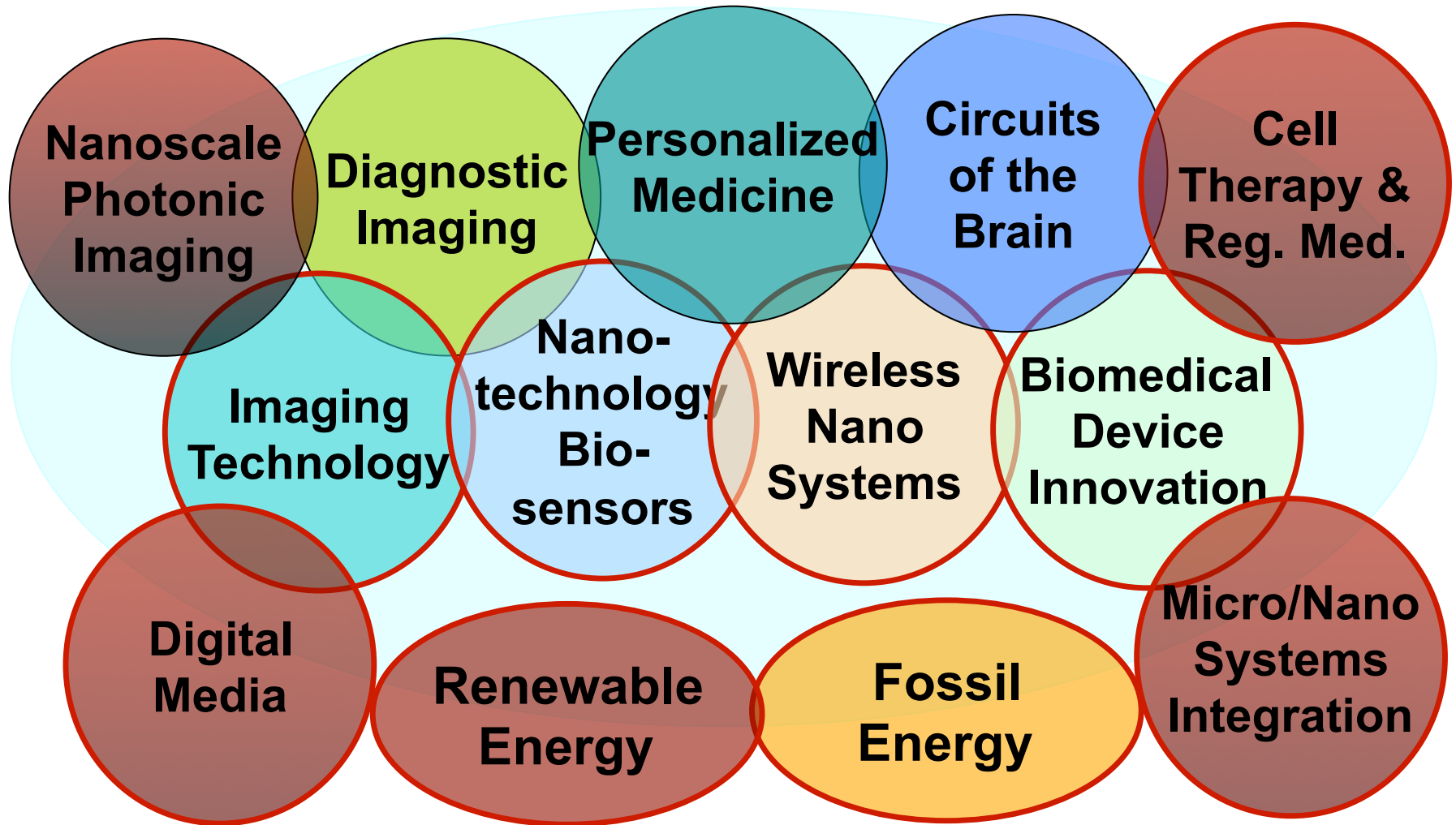
JEOL JEM 2800 Scanning TEM



FEI Helios Nanolab 650 FIB



# *USTAR Initiatives*

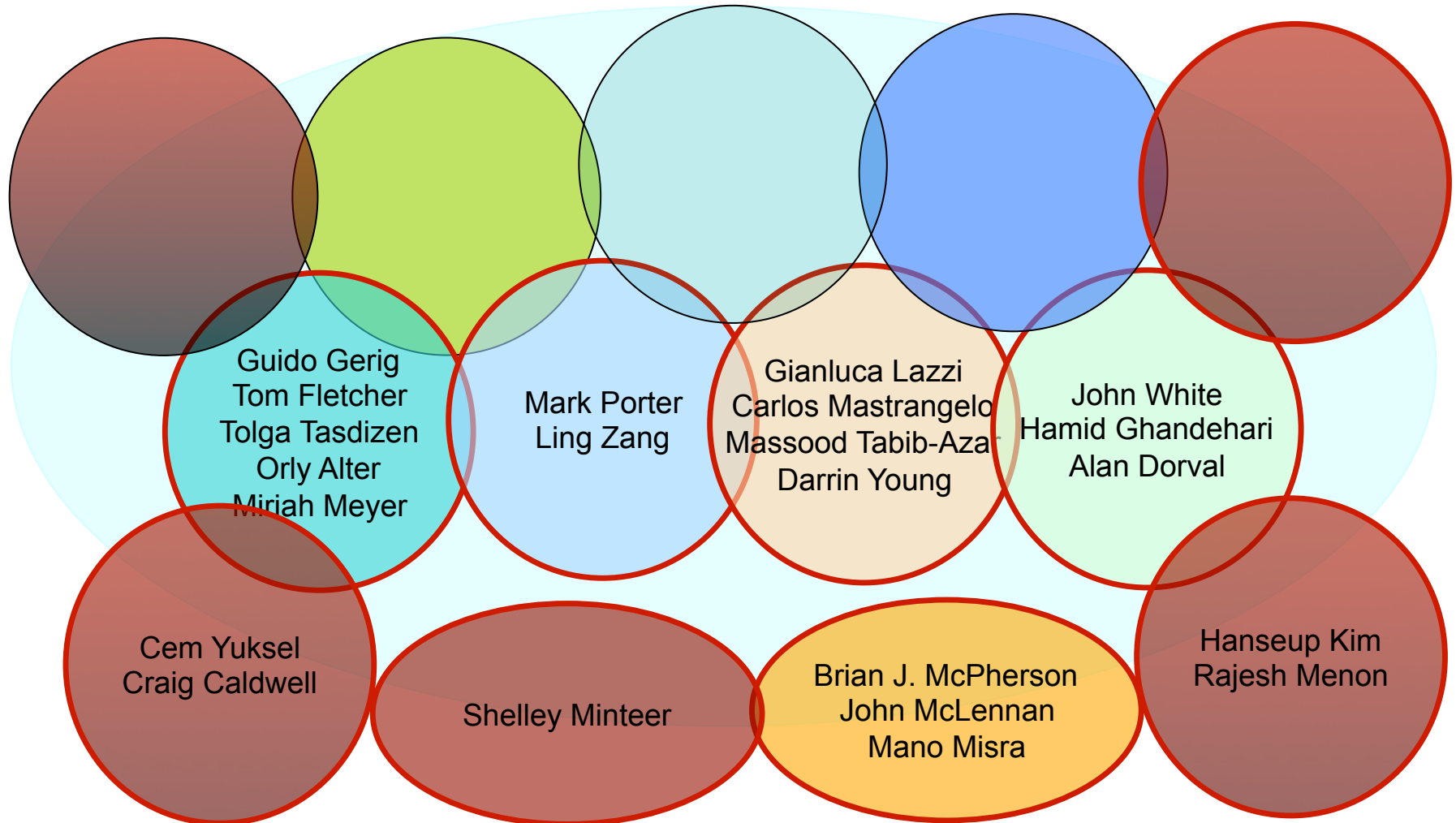






# USTAR Faculty

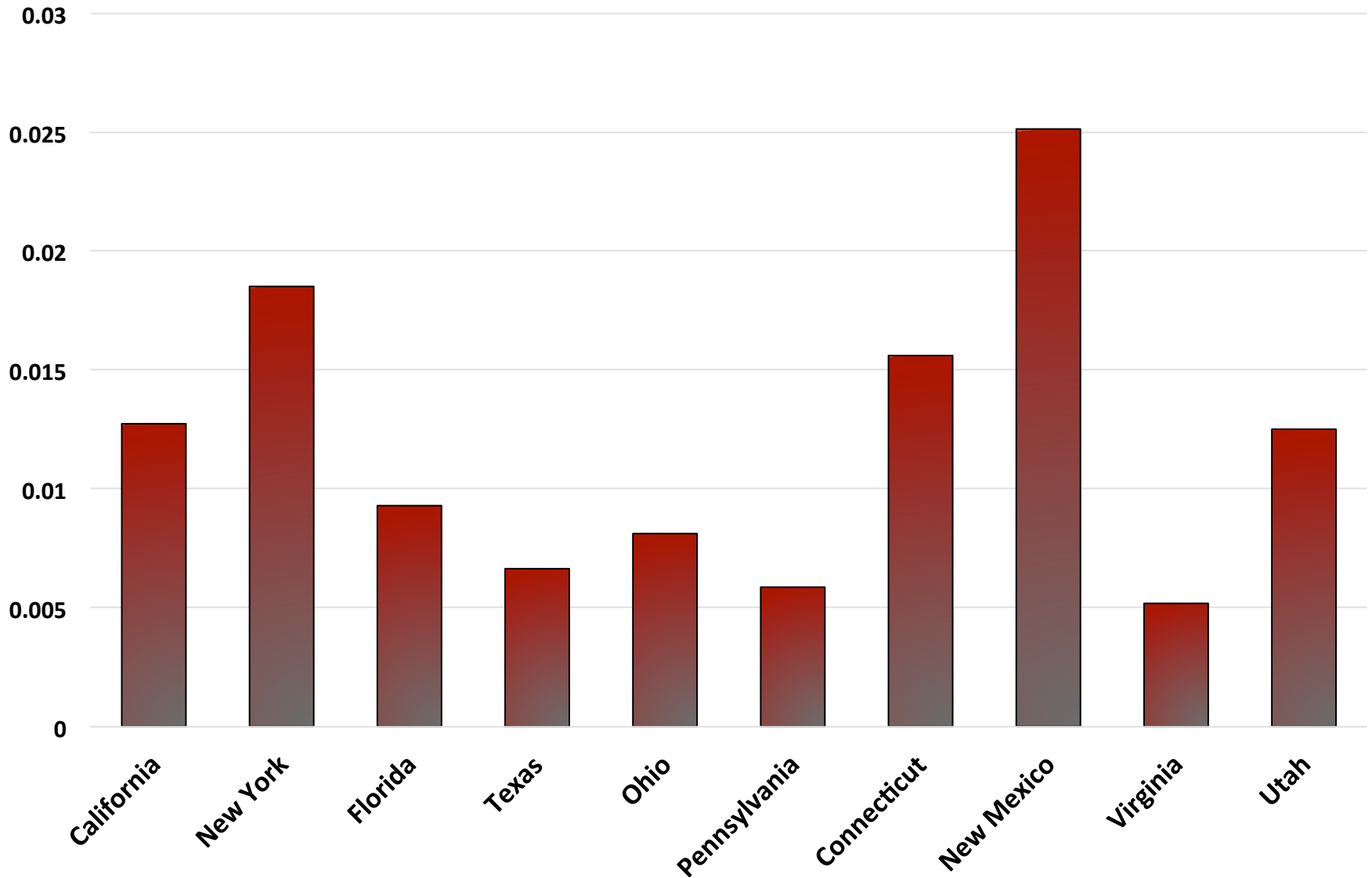
## 22 USTAR Faculty associated with Engineering







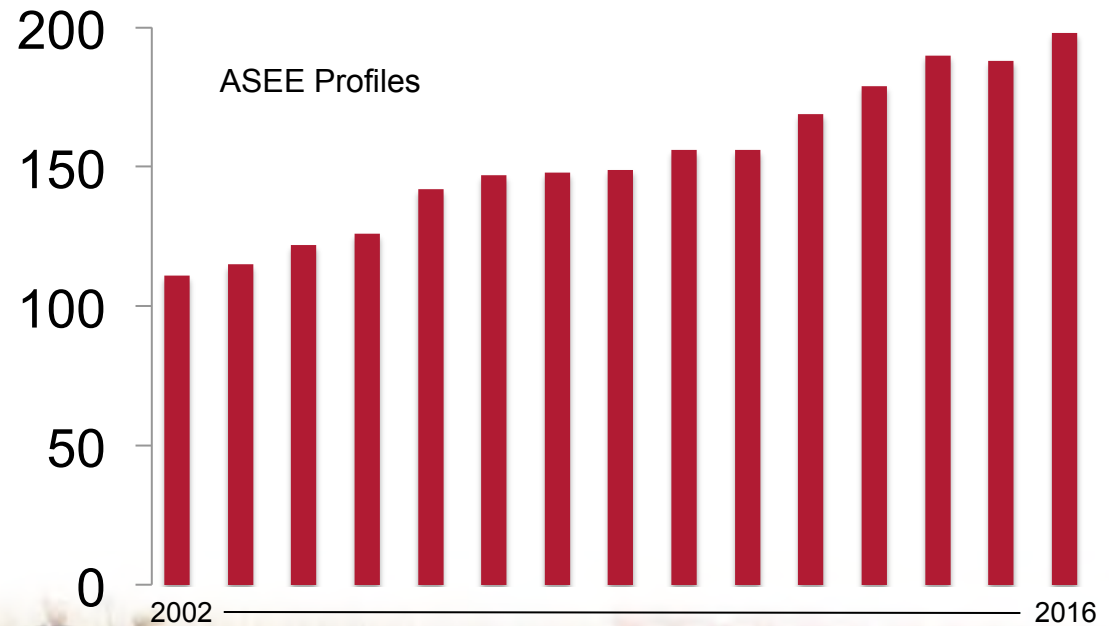
# State-Funded Research per Capita





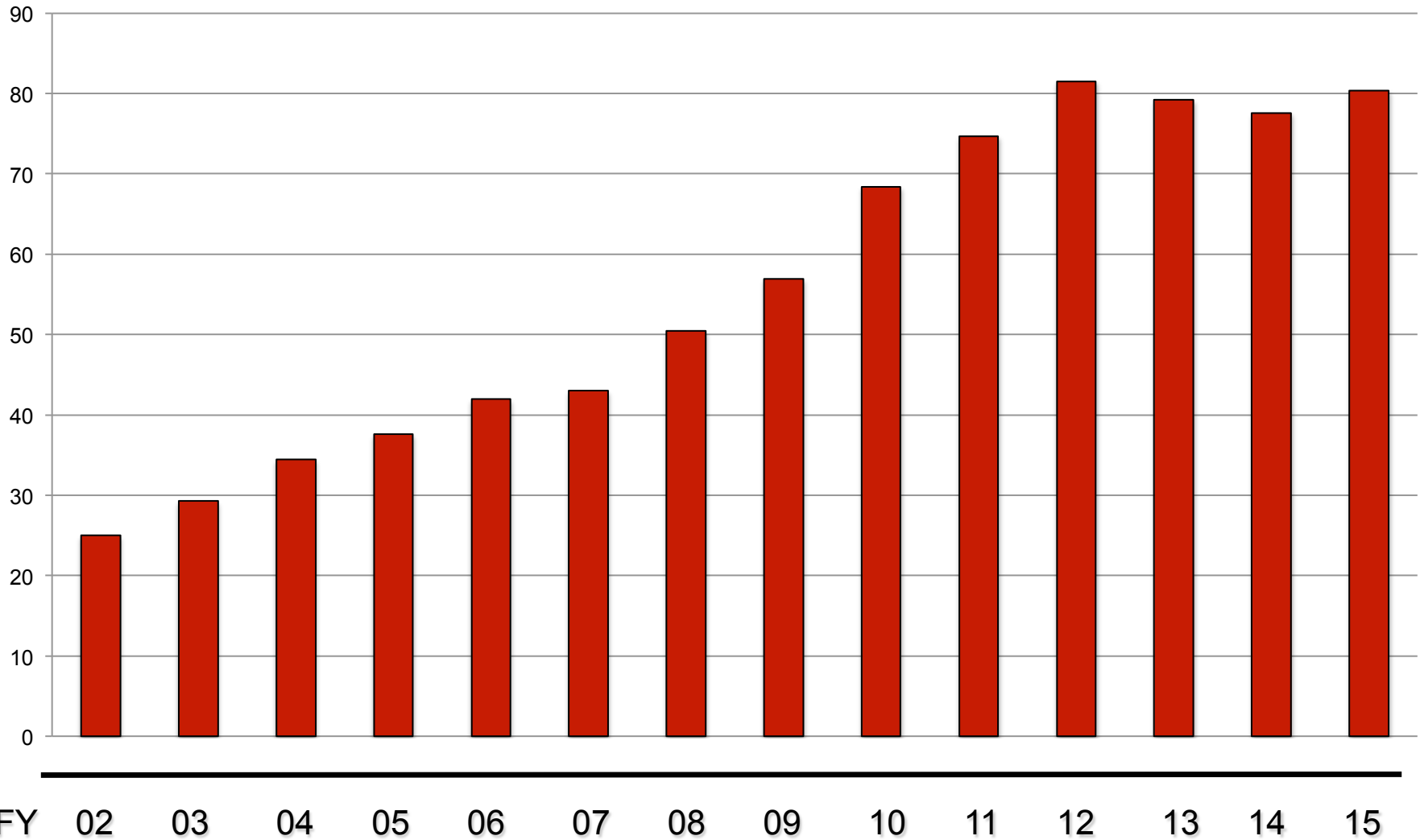
# Tenure-Track Faculty Growth

- *282 Full-time Faculty*  
*198 Tenure Track*  
*17 Lecturing Faculty*  
*67 Research Faculty*





# CoE Research Expenditures





# Myriad Genetics



Mark Skolnick



Peter Meldrum

## Genetic Testing for Hereditary

- Breast and Ovarian Cancer BRACA 1 & BRACA 2
- Uterine Cancer
- Colorectal Cancer
- Pancreatic Cancer
- Prostate Cancer Type







# BioFire



Carl Wittwer

## Rapid Cycle PCR

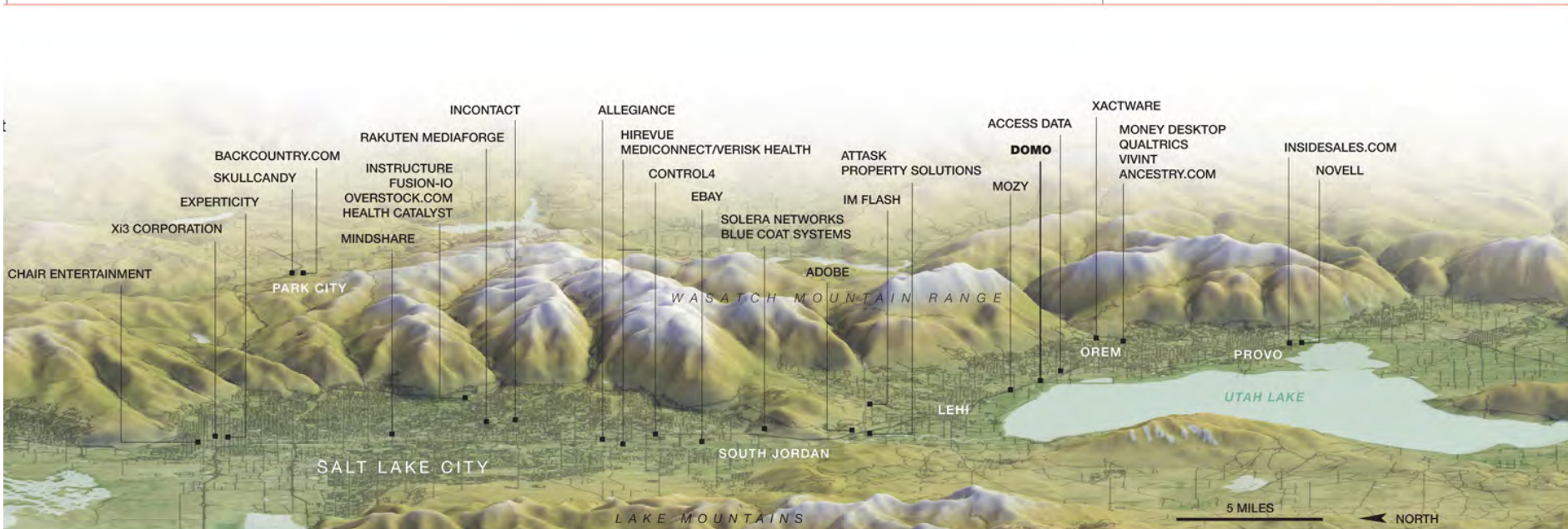
- Respiratory Panel (20 viruses & bacteria)
  - Blood Culture (27 bacteria & yeast)
  - Gastrointestinal (22 bacteria, parasites & viruses)
  - Meningitis/Encephalitis (14 bacteria, viruses, yeast)
  - Water, Military and Homeland Security Applications
- bioMérieux purchased for \$450M in 2014





# Growth in Technology Companies

- 1500 High Tech Companies to 5000+
- Utah is 7<sup>th</sup> in VC Investment, 3<sup>rd</sup> in VC Investment per capita
- Four Unicorns in 2015  
(Domo, Insidesales, Pluralsight, Qualtrics)





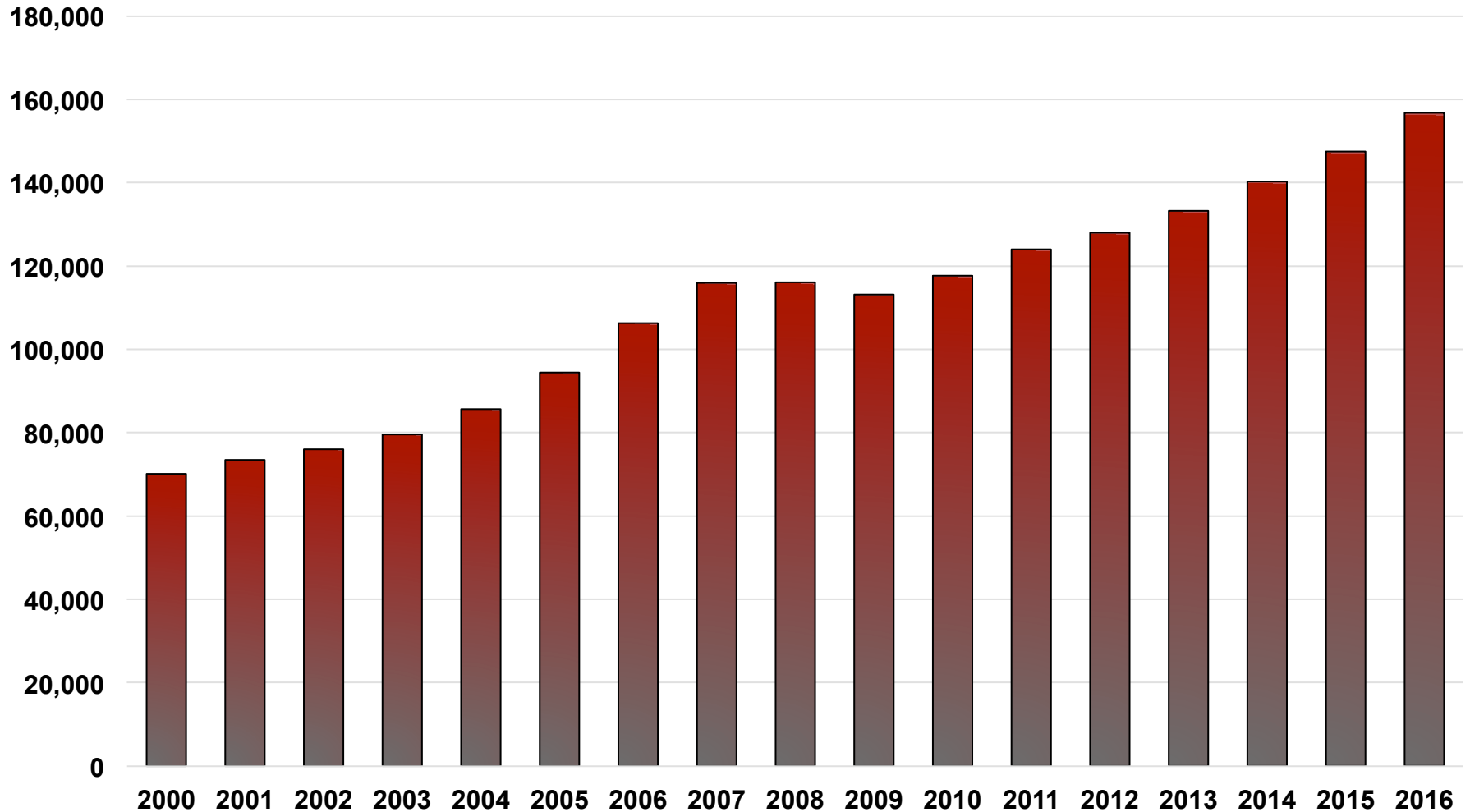
# *Ecosystem for Economic Growth*

- *Business-Friendly (taxes, regulation, labor law)*
- *Investment Community*
- *Infrastructure (airport, roads)*
- *Cost of Living*
- *Quality of Life*
- *Workforce*





# Utah Gross Domestic Product

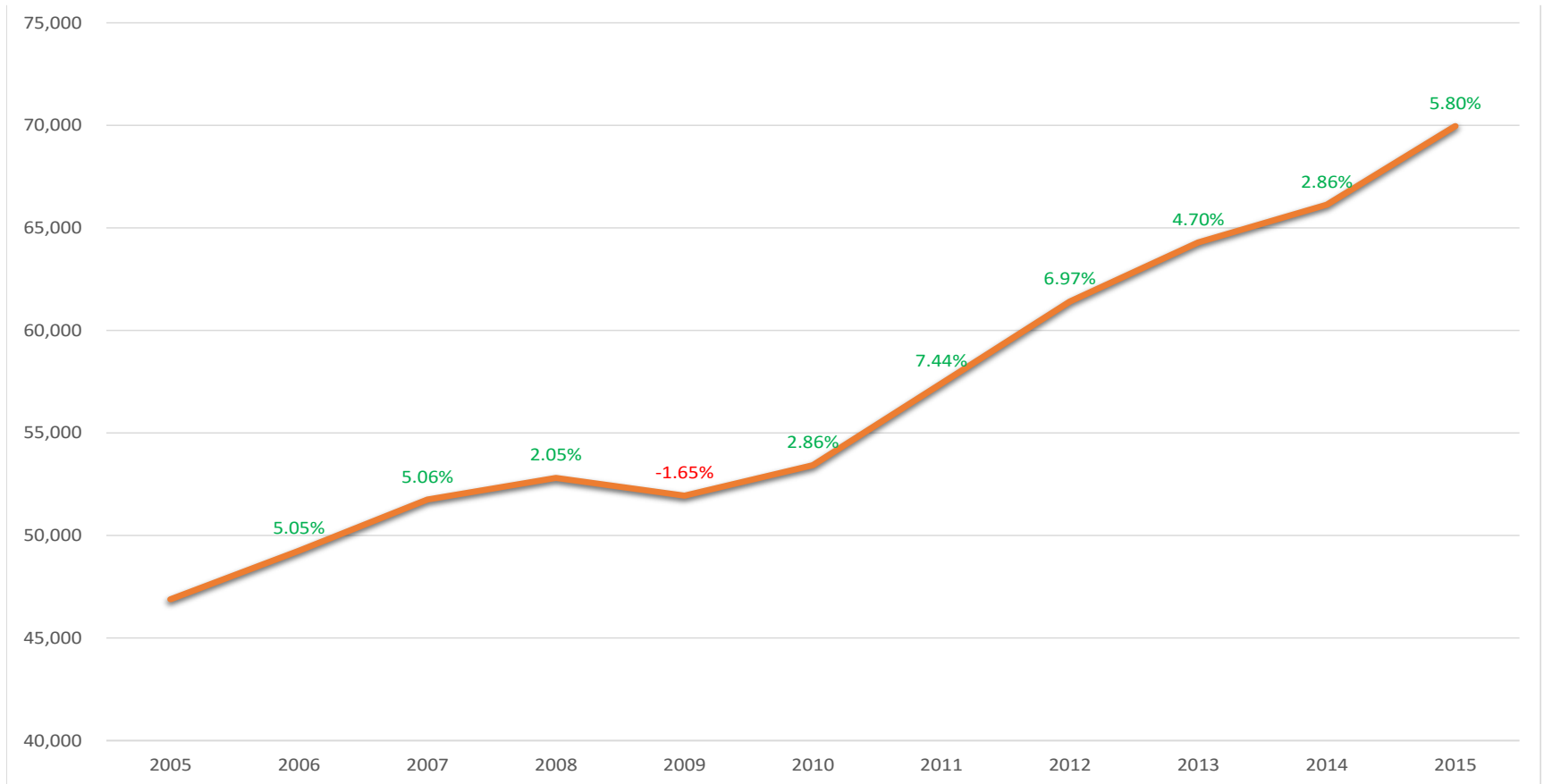


Source: United States Federal Reserve FRED Database



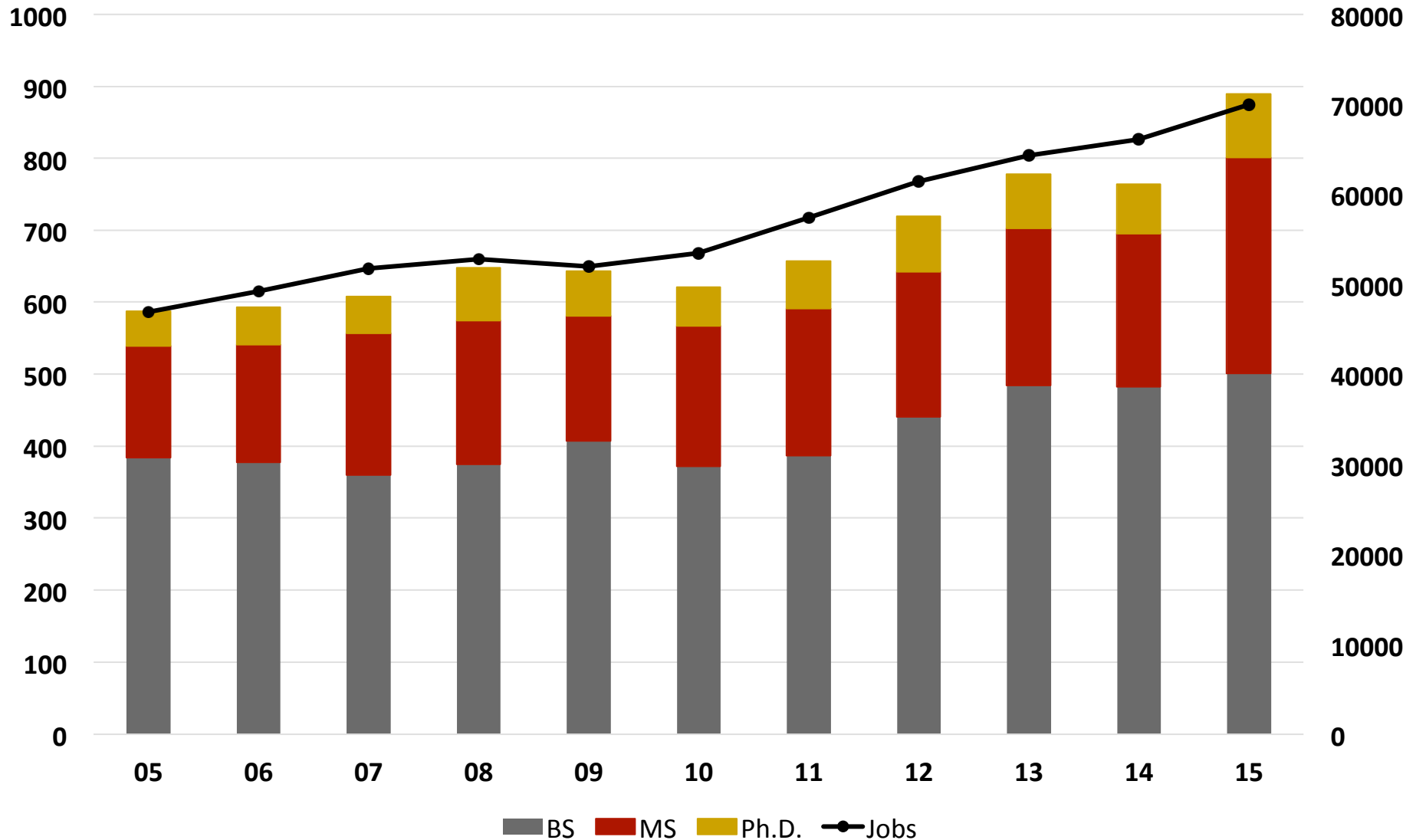


# Utah Tech Sector Employment



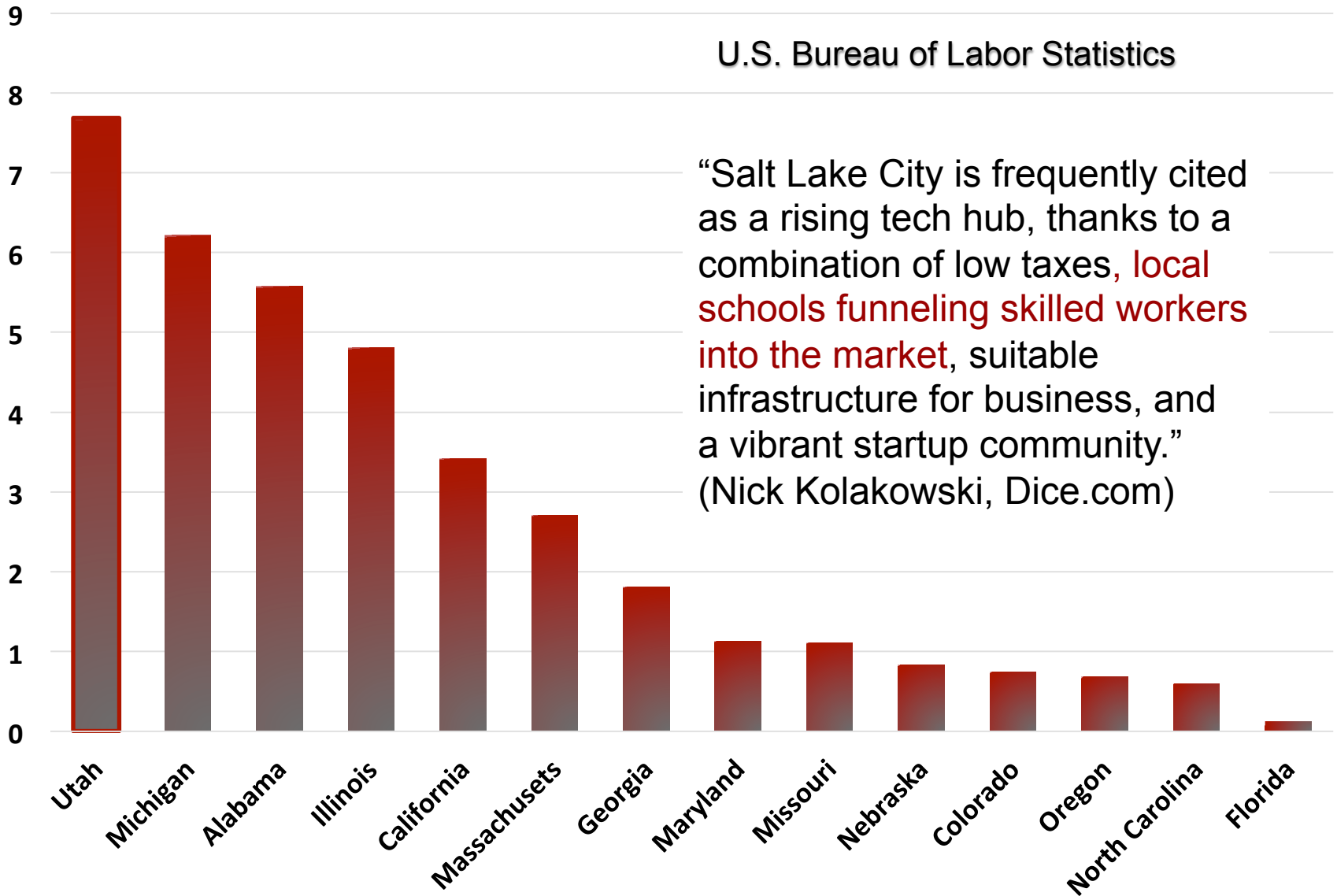


# Graduates and Jobs





# Fastest Growing Tech Sectors



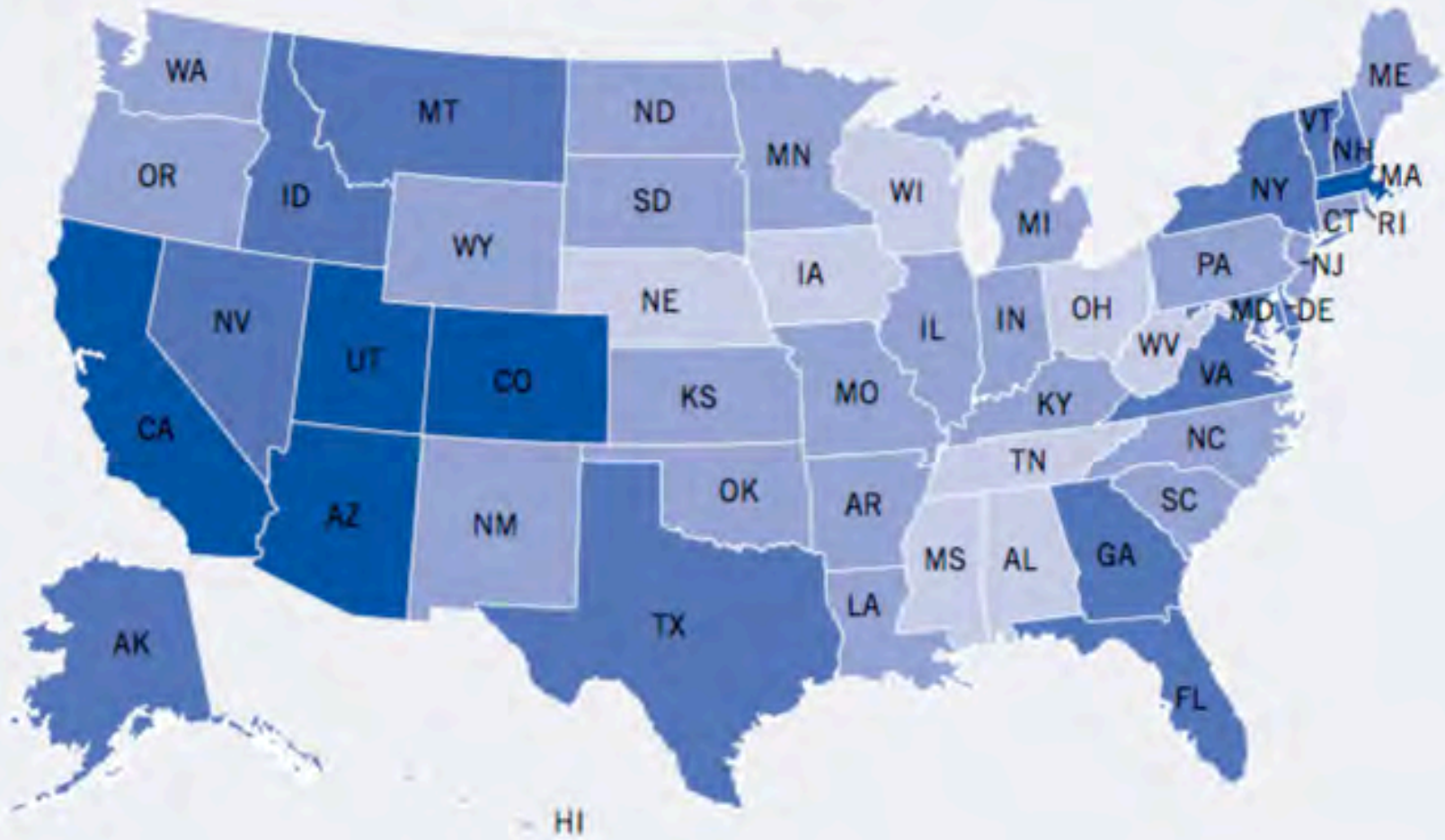
U.S. Bureau of Labor Statistics

“Salt Lake City is frequently cited as a rising tech hub, thanks to a combination of low taxes, **local schools funneling skilled workers into the market**, suitable infrastructure for business, and a vibrant startup community.”  
(Nick Kolakowski, Dice.com)



# #1 in Economic Dynamism

## Aggregated Economic Dynamism Scores

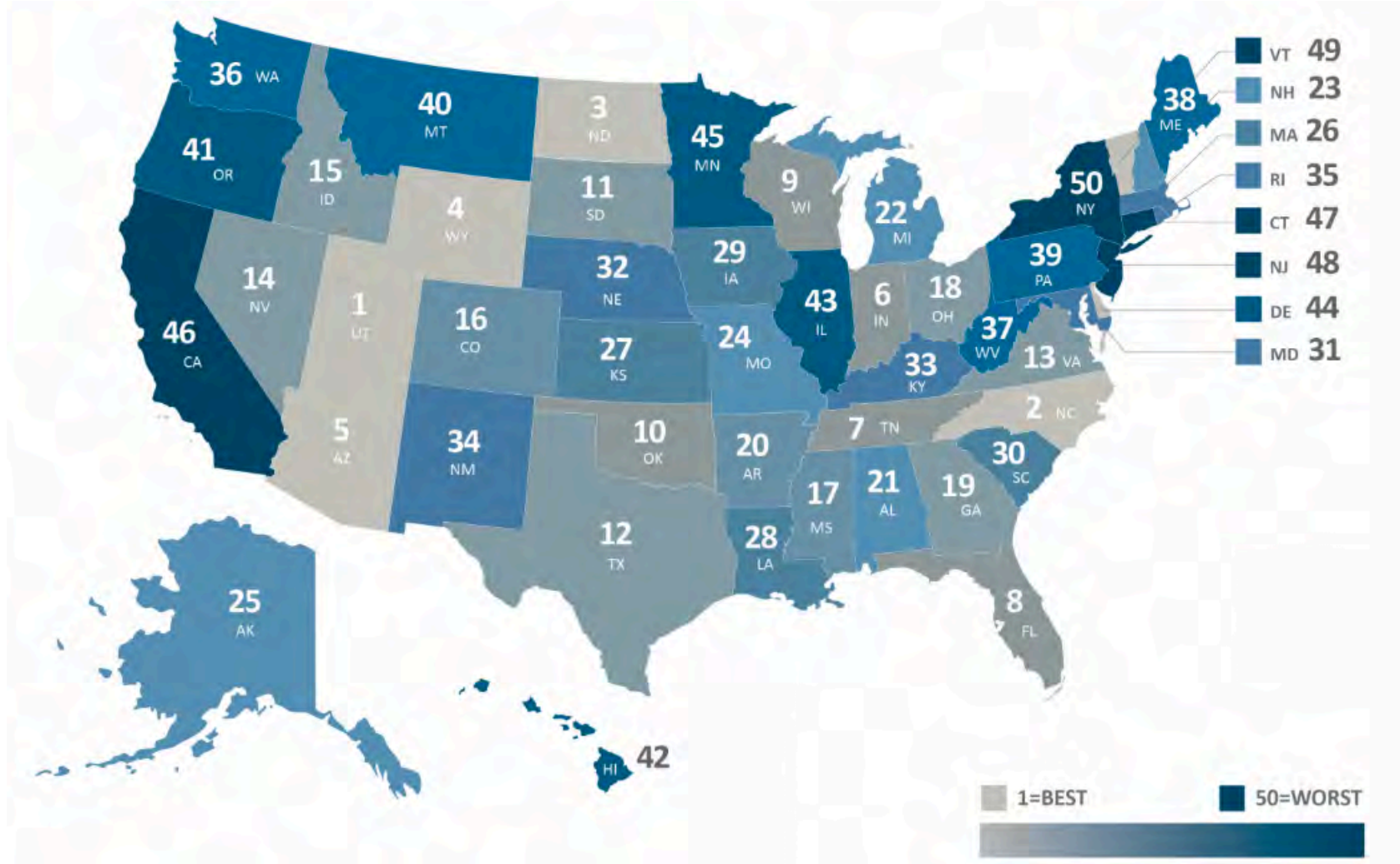


Source: The 2016 State New Economy Index





# #1 Best Economic Outlook



Source: American Legislative Exchange Council



# Utah's Economic Climate

## Salt Lake City

- #1 Best Cities to Start a Career (*WalletHub*)
- #1 Top Cities for High Paying Jobs (*Monster*)
- #1 Least Stressed City, (*CNNMoney*)
- #2 America's Next Boom Towns (*Forbes*)
- #2 Job creation among Large Metro Areas (*US Bureau of Labor Statistics*)
- #5 America's Fastest-Growing Cities (*Forbes*)
- 2.7% unemployment rate (compared to 4.7% nationally)

## Utah

- #1 Best State for Business (*Forbes* – 3<sup>rd</sup> year in a row)
- #1 America's Top States for Business (*CNBC*)
- #1 Fastest Growing Tech States (*Business Insider*)
- #1 Small Business Friendliness (*Ewing Marion Kauffman Foundation*)
- #2 GDP Growth (*U.S. Bureau of Economic Analysis*)
- #2 Personal Income Growth (*Pew Charitable Trusts*)
- #3 States with Total Job Growth (*US Bureau of Labor Statistics*)
- #6 Top 10 States in which to Start a Small Business (*TheStreet*)



# *Government Investment in Engineering*

- *Utah Invested in Engineering Education*
- *Utah Invested in Engineering Research (by growing faculty)*
- *Increased Federal Research Funding*
- *Benefits to State Economy*
  - *Workforce*
  - *Spin-out Companies*
  - *Entrepreneurial Culture*
  - *Ecosystem*