

Chapter 8. State Indicators

8-48 Academic Patents Awarded per 1,000 Science, Engineering, and Health Doctorate Holders in Academia

Description

Since the early 1980s, academic institutions have increasingly been viewed as engines of economic growth. Growing attention has been paid to the role of academic R&D in creating new products, processes, and services. One indicator of such R&D results is the volume of patents with inventors associated with academic institutions. Academic patenting is highly concentrated and partly reflects the resources devoted to institutional patenting offices.

This indicator relates the number of academic-owned utility patents to the size of the doctoral S&E workforce in academia and is one approximate measure of the degree to which results with perceived economic value are generated by the doctoral academic workforce. Academia includes 2-year colleges, 4-year colleges and universities, medical schools, and university-affiliated research centers. Utility patents, commonly known as patents for inventions, include any new, useful, or improved method, process, machine, device, manufactured item, or chemical compound and represent a key measure of intellectual property. Patent assignments are made on the basis of the address of their inventors. For patents with multiple U.S. university inventors from different U.S. states, patents are fractionally allocated among each U.S. state based on the proportion of residences of all named inventors.

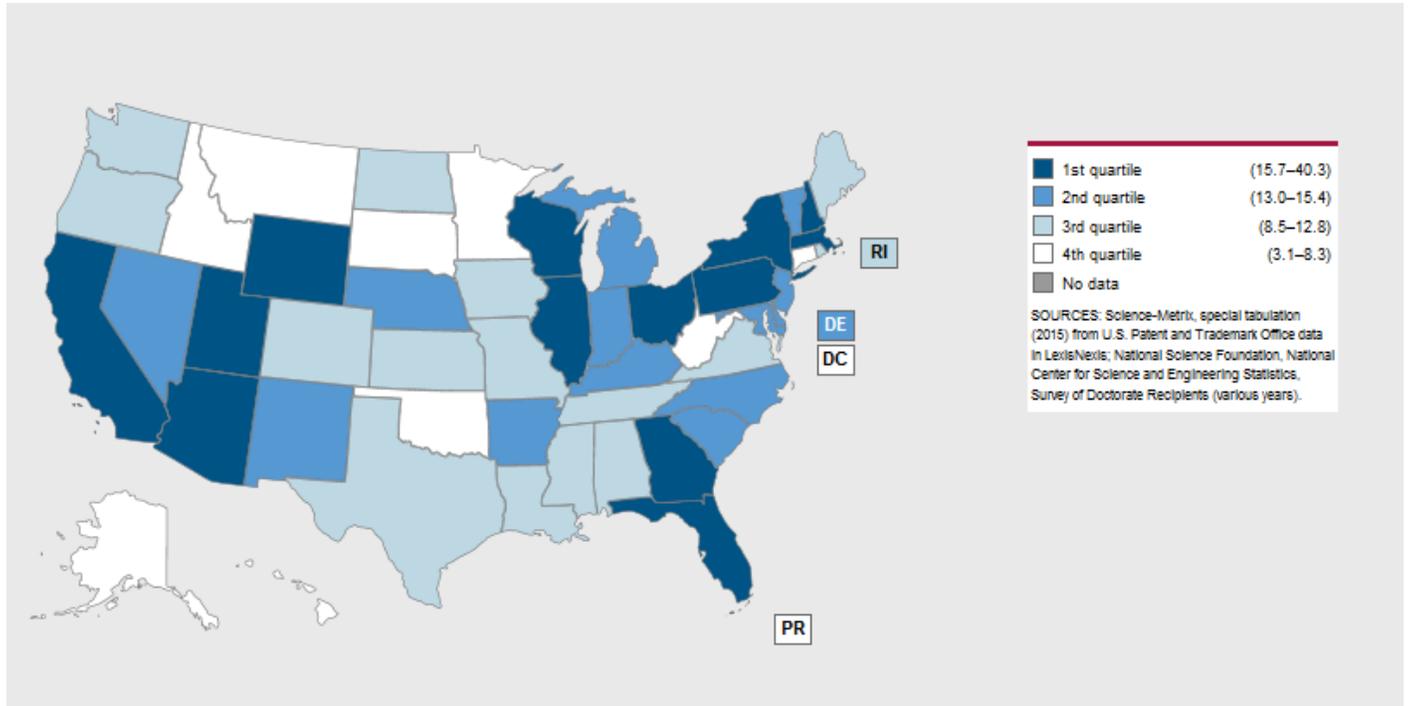
Science, engineering, and health (SEH) doctorates include those in computer sciences; mathematics; biological, agricultural, or environmental life sciences; physical sciences; social sciences; psychology; engineering; and health fields. SEH doctorate data exclude those with doctorates from foreign institutions and those older than the age of 75. For states with smaller populations, estimates of doctorate holders in academia are generally less precise than estimates for states with larger populations. Data for SEH doctorate holders are presented by employment location regardless of residence.

Findings

- Throughout the United States, the number of new patents with academic institution-affiliated inventors increased 63% from 3,455 in 2003 to 5,625 in 2013; the number of academic SEH doctorate holders rose by 22% during the same period (from 267,200 to 327,300).
- In 2013, 17.2 academic patents were awarded to academic institutions per 1,000 SEH doctorate holders in academia. This is 33% larger than the 2003 value of 12.9.
- In 2013, states varied widely, with values ranging from 3.1 to 40.3 patents per 1,000 SEH doctorate holders employed in academia.
- California showed a high level of both academic patenting and venture capital investment.

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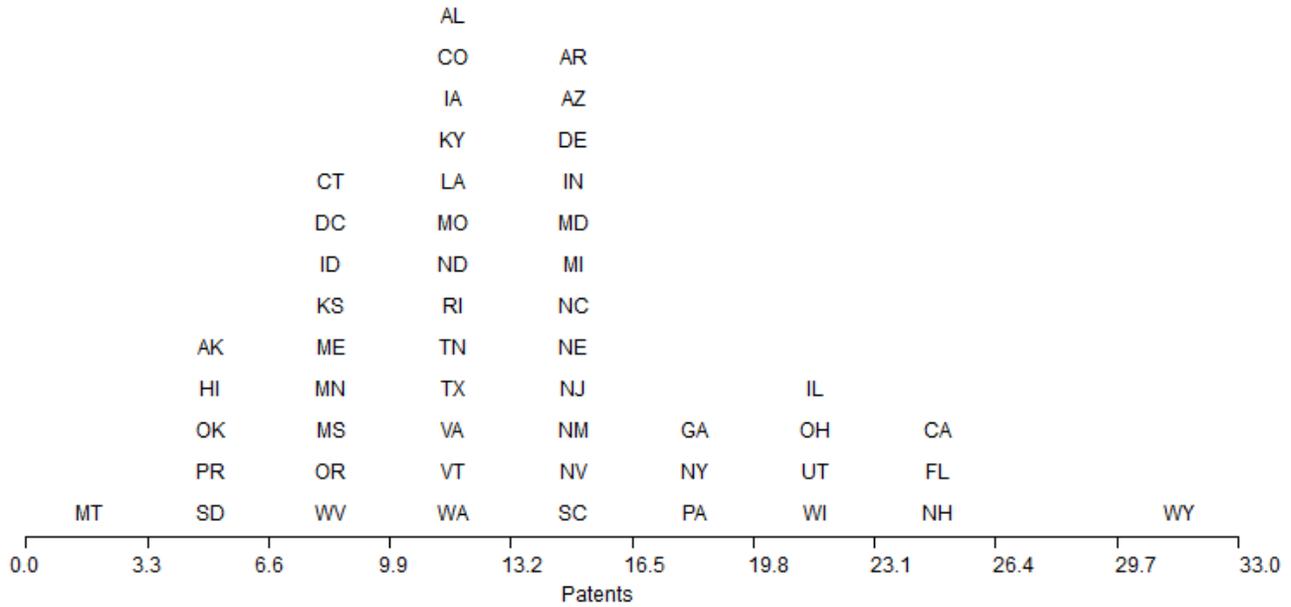
Year: 2013



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Distribution of states across indicator values



Histograms do not display states with extreme values. Please consult the data tables for exact indicator values for each state.

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Table 8-48 Academic Patents Awarded per 1,000 Science, Engineering, and Health Doctorate Holders in Academia

State	Academic patents/1,000 academic SEH doctorate holders (Patents)							
	1997	1999	2001	2003	2006	2008	2010	2013
United States	11.3	15.2	13.7	12.9	12.6	10.9	15.0	17.2
Alabama	5.2	16.9	14.7	16.9	8.8	5.9	9.2	12.0
Alaska	5.0	6.0	2.0	1.7	1.7	0.0	5.7	5.6
Arizona	7.2	6.9	6.3	6.2	8.9	7.2	7.2	15.7
Arkansas	4.7	14.7	16.9	14.4	13.2	12.0	12.0	13.2
California	18.1	26.0	26.2	23.8	25.3	18.3	23.2	25.0
Colorado	8.2	10.7	7.9	7.1	6.2	6.6	8.4	10.0
Connecticut	8.5	11.8	9.3	10.0	10.9	5.7	11.0	8.3
Delaware	5.7	4.3	6.3	10.0	6.3	15.0	22.2	13.6
District of Columbia	6.8	5.0	4.8	6.7	4.8	5.0	4.8	7.6
Florida	15.4	13.2	13.5	15.0	18.4	13.4	22.0	23.6
Georgia	7.8	12.1	11.1	11.0	10.9	9.0	14.4	19.3
Hawaii	5.0	5.0	4.0	3.3	6.3	3.9	3.1	3.9
Idaho	7.5	2.5	6.7	7.3	6.4	3.1	8.3	6.7
Illinois	7.8	9.7	10.5	10.1	10.7	12.7	17.0	20.4
Indiana	9.1	4.9	3.2	4.0	5.1	4.5	10.4	15.0
Iowa	15.8	24.2	20.3	17.6	14.3	8.5	14.4	11.8
Kansas	3.6	13.2	8.6	7.4	1.9	3.0	9.2	8.5
Kentucky	5.7	11.0	6.3	9.1	7.5	6.8	11.4	13.0
Louisiana	8.2	5.6	13.6	9.4	7.4	9.7	8.3	10.9
Maine	0.8	1.5	1.8	3.3	3.3	3.3	8.2	8.5
Maryland	11.7	23.5	20.3	16.9	19.2	13.7	16.3	14.6
Massachusetts	27.8	34.1	28.1	25.5	24.9	26.0	32.9	40.3
Michigan	13.5	16.4	12.6	14.4	13.4	14.7	13.4	14.3
Minnesota	7.7	8.6	6.8	7.2	6.4	5.5	6.2	7.8

State	Academic patents/1,000 academic SEH doctorate holders (Patents)							
	1997	1999	2001	2003	2006	2008	2010	2013
Mississippi	4.2	6.7	6.5	5.5	7.5	10.5	7.4	8.5
Missouri	7.9	14.8	9.8	8.9	8.2	4.9	9.0	11.8
Montana	5.0	7.3	5.0	2.7	4.2	7.5	5.4	3.1
Nebraska	11.3	12.2	11.1	10.6	10.0	11.7	10.5	13.2
Nevada	2.0	4.0	3.1	7.5	2.5	3.6	8.6	14.0
New Hampshire	2.7	8.0	7.5	7.5	15.8	6.7	12.5	25.3
New Jersey	10.8	18.1	14.8	12.6	13.7	12.8	14.0	14.4
New Mexico	12.2	23.1	18.9	30.4	17.1	7.7	9.1	15.4
New York	12.3	15.9	14.8	14.0	13.1	11.9	17.4	16.9
North Carolina	11.8	14.1	15.8	13.8	12.2	9.8	12.6	13.7
North Dakota	6.7	6.3	5.7	4.3	4.0	3.3	7.3	11.0
Ohio	8.4	11.3	10.4	9.3	10.3	7.3	16.6	22.5
Oklahoma	5.9	6.5	5.7	2.5	9.3	5.3	10.9	5.6
Oregon	6.5	6.7	7.7	4.4	5.7	7.6	6.3	8.8
Pennsylvania	11.7	16.5	15.9	11.3	9.9	9.3	13.6	17.6
Rhode Island	7.6	12.2	17.1	11.4	8.0	10.0	11.3	11.7
South Carolina	4.5	3.6	4.8	10.0	6.3	4.3	7.8	13.3
South Dakota	2.9	1.4	3.3	0.0	2.9	4.3	4.3	3.8
Tennessee	5.7	6.6	9.4	5.7	6.7	5.0	8.2	12.0
Texas	9.6	11.4	11.5	10.6	11.7	9.0	11.1	12.8
Utah	13.0	13.9	15.3	9.3	10.3	11.2	20.3	22.4
Vermont	2.7	6.0	3.0	5.0	5.0	8.9	13.3	13.0
Virginia	8.7	9.5	5.5	7.6	6.2	6.0	11.8	11.1
Washington	10.2	11.4	10.0	7.1	6.1	7.5	11.9	12.0
West Virginia	1.7	1.8	3.6	10.8	1.5	1.7	7.7	6.9
Wisconsin	12.6	16.9	15.6	18.0	18.1	15.9	21.9	22.6
Wyoming	6.7	6.7	1.7	8.0	8.0	4.0	16.0	30.0
Puerto Rico	0.0	0.0	6.0	5.4	1.5	1.5	1.3	3.3

Academic patents/1,000 academic SEH doctorate holders (Patents)

State	1997	1999	2001	2003	2006	2008	2010	2013
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SEH = science, engineering, and health.

NOTES: Patents are fractionally allocated among regions /countries/economies based on the proportion of residences of all named inventors. The total for the United States includes patents for which the location could not be determined. Employed SEH doctorate holders are classified by employment location.

SOURCES: Science-Metrix, special tabulation (2015) from U.S. Patent and Trademark Office data in LexisNexis; National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients (various years).

Science and Engineering Indicators 2016

State	Patents awarded to academic institutions							
	1997	1999	2001	2003	2006	2008	2010	2013
United States	2,673	3,696	3,444	3,455	3,520	3,029	4,507	5,625
Alabama	24	54	44	54	29	20	33	48
Alaska	2	3	1	1	1	0	4	5
Arizona	21	20	20	21	34	28	28	77
Arkansas	7	25	27	26	25	18	24	25
California	450	649	658	678	697	539	739	881
Colorado	36	49	38	36	33	33	47	65
Connecticut	33	53	39	42	49	28	57	45
Delaware	4	3	5	7	5	12	20	15
District of Columbia	13	12	12	16	11	10	11	22
Florida	100	98	105	123	166	125	235	300
Georgia	43	70	70	77	81	70	121	174
Hawaii	6	7	6	6	10	7	5	7
Idaho	6	2	6	8	9	4	10	10
Illinois	80	99	111	106	122	141	207	249
Indiana	42	25	18	23	31	26	70	105
Iowa	49	80	65	60	50	33	56	45
Kansas	8	25	19	17	5	8	23	23
Kentucky	17	34	20	30	27	23	40	48
Louisiana	28	18	45	32	25	28	25	35
Maine	1	2	2	4	4	4	9	11
Maryland	69	134	118	115	138	107	129	136
Massachusetts	317	447	362	362	356	341	464	653
Michigan	105	128	110	128	125	129	137	153
Minnesota	33	43	36	39	36	29	37	49
Mississippi	8	14	13	11	15	20	14	17
Missouri	45	80	55	50	46	28	57	80
Montana	5	8	4	3	5	9	7	4
Nebraska	26	22	21	19	18	21	22	25

State	Patents awarded to academic institutions							
	1997	1999	2001	2003	2006	2008	2010	2013
Nevada	2	4	4	9	4	5	12	21
New Hampshire	3	8	9	9	19	10	20	43
New Jersey	53	85	80	72	82	77	88	105
New Mexico	28	60	53	85	36	17	21	37
New York	239	322	299	295	285	261	412	443
North Carolina	90	114	136	127	121	99	131	153
North Dakota	6	5	4	3	4	3	8	11
Ohio	81	114	102	96	104	71	168	250
Oklahoma	16	17	16	7	26	16	36	18
Oregon	17	20	24	16	20	25	22	35
Pennsylvania	138	215	211	173	157	137	218	298
Rhode Island	13	22	29	24	16	17	18	21
South Carolina	14	10	14	28	22	15	28	52
South Dakota	2	1	2	0	2	3	3	3
Tennessee	26	29	44	29	37	27	49	77
Texas	128	151	157	157	194	159	214	263
Utah	39	39	46	25	36	38	71	92
Vermont	3	6	3	5	5	8	12	13
Virginia	47	60	36	53	47	50	99	100
Washington	53	65	62	47	43	53	86	95
West Virginia	2	2	4	13	2	2	10	11
Wisconsin	67	88	78	90	103	94	147	167
Wyoming	4	4	1	4	4	2	8	15
Puerto Rico	0	0	6	7	2	2	2	6

Patents awarded to academic institutions

State	1997	1999	2001	2003	2006	2008	2010	2013
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SEH = science, engineering, and health.

NOTES: Patents are fractionally allocated among regions /countries/economies based on the proportion of residences of all named inventors. The total for the United States includes patents for which the location could not be determined. Employed SEH doctorate holders are classified by employment location.

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Science and Engineering Indicators 2016

State	SEH doctorate holders in academia							
	1997	1999	2001	2003	2006	2008	2010	2013
United States	236,400	243,800	250,600	267,200	278,900	279,000	300,400	327,300
Alabama	4,600	3,200	3,000	3,200	3,300	3,400	3,600	4,000
Alaska	400	500	500	600	600	700	700	800
Arizona	2,900	2,900	3,200	3,400	3,800	3,900	3,900	4,900
Arkansas	1,500	1,700	1,600	1,800	1,900	1,500	2,000	1,900
California	24,800	25,000	25,100	28,500	27,600	29,500	31,800	35,200
Colorado	4,400	4,600	4,800	5,100	5,300	5,000	5,600	6,500
Connecticut	3,900	4,500	4,200	4,200	4,500	4,900	5,200	5,400
Delaware	700	700	800	700	800	800	900	1,100
District of Columbia	1,900	2,400	2,500	2,400	2,300	2,000	2,300	2,900
Florida	6,500	7,400	7,800	8,200	9,000	9,300	10,700	12,700
Georgia	5,500	5,800	6,300	7,000	7,400	7,800	8,400	9,000
Hawaii	1,200	1,400	1,500	1,800	1,600	1,800	1,600	1,800
Idaho	800	800	900	1,100	1,400	1,300	1,200	1,500
Illinois	10,200	10,200	10,600	10,500	11,400	11,100	12,200	12,200
Indiana	4,600	5,100	5,600	5,700	6,100	5,800	6,700	7,000
Iowa	3,100	3,300	3,200	3,400	3,500	3,900	3,900	3,800
Kansas	2,200	1,900	2,200	2,300	2,600	2,700	2,500	2,700
Kentucky	3,000	3,100	3,200	3,300	3,600	3,400	3,500	3,700
Louisiana	3,400	3,200	3,300	3,400	3,400	2,900	3,000	3,200
Maine	1,300	1,300	1,100	1,200	1,200	1,200	1,100	1,300
Maryland	5,900	5,700	5,800	6,800	7,200	7,800	7,900	9,300
Massachusetts	11,400	13,100	12,900	14,200	14,300	13,100	14,100	16,200
Michigan	7,800	7,800	8,700	8,900	9,300	8,800	10,200	10,700
Minnesota	4,300	5,000	5,300	5,400	5,600	5,300	6,000	6,300
Mississippi	1,900	2,100	2,000	2,000	2,000	1,900	1,900	2,000
Missouri	5,700	5,400	5,600	5,600	5,600	5,700	6,300	6,800
Montana	1,000	1,100	800	1,100	1,200	1,200	1,300	1,300
Nebraska	2,300	1,800	1,900	1,800	1,800	1,800	2,100	1,900

State	SEH doctorate holders in academia							
	1997	1999	2001	2003	2006	2008	2010	2013
Nevada	1,000	1,000	1,300	1,200	1,600	1,400	1,400	1,500
New Hampshire	1,100	1,000	1,200	1,200	1,200	1,500	1,600	1,700
New Jersey	4,900	4,700	5,400	5,700	6,000	6,000	6,300	7,300
New Mexico	2,300	2,600	2,800	2,800	2,100	2,200	2,300	2,400
New York	19,500	20,300	20,200	21,100	21,800	22,000	23,700	26,200
North Carolina	7,600	8,100	8,600	9,200	9,900	10,100	10,400	11,200
North Dakota	900	800	700	700	1,000	900	1,100	1,000
Ohio	9,600	10,100	9,800	10,300	10,100	9,700	10,100	11,100
Oklahoma	2,700	2,600	2,800	2,800	2,800	3,000	3,300	3,200
Oregon	2,600	3,000	3,100	3,600	3,500	3,300	3,500	4,000
Pennsylvania	11,800	13,000	13,300	15,300	15,800	14,700	16,000	16,900
Rhode Island	1,700	1,800	1,700	2,100	2,000	1,700	1,600	1,800
South Carolina	3,100	2,800	2,900	2,800	3,500	3,500	3,600	3,900
South Dakota	700	700	600	600	700	700	700	800
Tennessee	4,600	4,400	4,700	5,100	5,500	5,400	6,000	6,400
Texas	13,400	13,300	13,600	14,800	16,600	17,600	19,300	20,600
Utah	3,000	2,800	3,000	2,700	3,500	3,400	3,500	4,100
Vermont	1,100	1,000	1,000	1,000	1,000	900	900	1,000
Virginia	5,400	6,300	6,500	7,000	7,600	8,300	8,400	9,000
Washington	5,200	5,700	6,200	6,600	7,000	7,100	7,200	7,900
West Virginia	1,200	1,100	1,100	1,200	1,300	1,200	1,300	1,600
Wisconsin	5,300	5,200	5,000	5,000	5,700	5,900	6,700	7,400
Wyoming	600	600	600	500	500	500	500	500
Puerto Rico	600	900	1,000	1,300	1,300	1,300	1,500	1,800



SEH doctorate holders in academia

State	1997	1999	2001	2003	2006	2008	2010	2013
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