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APPENDIX A

**TABLE 1-A
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Baccalaureate Degree Program)**

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Upper-level students who are transferring from other majors within the university**	0	0	0	0	0	0	0	0
Students who initially entered the university as FTTC students and who are progressing from the lower to the upper level***	0	0	0	0	0	0	0	0
Florida College System transfers to the upper level***	0	0	0	0	0	0	0	0
Transfers to the upper level from other Florida colleges and universities***	0	0	0	0	0	0	0	0
Transfers from out of state colleges and universities***	0	0	0	0	0	0	0	0
Other (Explain)***	0	0	0	0	0	0	0	0
Totals	0	0	0	0	0	0	0	0

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions

** If numbers appear in this category, they should go DOWN in later years.

*** Do not include individuals counted in any PRIOR CATEGORY in a given COLUMN.

Year 5	
HC	FTE
0	0
0	0
0	0
0	0
0	0
0	0
0	0

sions.

APPENDIX A
TABLE 1-B
PROJECTED HEADCOUNT FROM POTENTIAL SOURCES
(Graduate Degree Program)

Source of Students (Non-duplicated headcount in any given year)*	Year 1		Year 2		Year 3		Year 4		Year 5	
	HC	FTE	HC	FTE	HC	FTE	HC	FTE	HC	FTE
Individuals drawn from agencies/industries in your service area (e.g., older returning students)	0	0	0	0	0	0	0	0	0	0
Students who transfer from other graduate programs within the university**	0	0	0	0	0	0	0	0	0	0
Individuals who have recently graduated from preceding degree programs at this university	1	1	2	2	3	3	4	4	5	5
Individuals who graduated from preceding degree programs at other Florida public universities	2	2	4	4	7	7	10	10	13	13
Individuals who graduated from preceding degree programs at non-public Florida institutions	1	1	2	2	3	3	4	4	6	6
Additional in-state residents***	0	0	0	0	0	0	0	0	0	0
Additional out-of-state residents***	0	0	0	0	0	0	0	0	0	0
Additional foreign residents***	0	0	0	0	0	0	0	0	0	0
Other - Individuals who graduated from preceding degree programs from out of state or non-US institutions (public or private)	4	4	8	8	13	13	18	18	24	24
Totals	8	8	16	16	26	26	36	36	48	48

* List projected annual headcount of students enrolled in the degree program. List projected yearly cumulative ENROLLMENTS instead of admissions.

** If numbers appear in this category, they should go DOWN in later years.

*** Do not include individuals counted in any PRIOR category in a given COLUMN.

APPENDIX A

TABLE 2 PROJECTED COSTS AND FUNDING SOURCES

Instruction & Research Costs (non-cumulative)	Funding Source														
	Year 1							Year 5							
	Reallocated Base* (E&G)	Enrollment Growth (E&G)	New Recurring (E&G)	New Non-Recurring (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	Subtotal columns 1+...+7	Continuing Base** (E&G)	New Enrollment Growth (E&G)	Other**** (E&G)	Contracts & Grants (C&G)	Philanthropy Endowments	Enterprise Auxiliary Funds	Subtotal columns 9+...+14
Columns	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Faculty Salaries and Benefits	\$139,946	\$0	\$0	\$0	\$0	\$0	\$0	\$139,946	\$139,946	\$436,916	\$0	\$0	\$0	\$0	\$576,862
A & P Salaries and Benefits	\$66,738	\$0	\$0	\$0	\$0	\$0	\$0	\$66,738	\$66,738	\$0	\$0	\$0	\$0	\$0	\$66,738
USPS Salaries and Benefits	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Other Personal Services	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Assistantships & Fellowships	\$240,000	\$0	\$0	\$0	\$0	\$0	\$0	\$240,000	\$240,000	\$809,550	\$0	\$390,450	\$0	\$0	\$1,440,000
Library	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Expenses	\$20,000	\$0	\$0	\$0	\$0	\$0	\$0	\$20,000	\$20,000	\$0	\$0	\$0	\$0	\$0	\$20,000
Operating Capital Outlay	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Special Categories	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Costs	\$466,684	\$0	\$0	\$0	\$0	\$0	\$0	\$466,684	\$466,684	\$1,246,466	\$0	\$390,450	\$0	\$0	\$2,103,600

*Identify reallocation sources in Table 3.

**Includes recurring E&G funded costs ("reallocated base," "enrollment growth," and "new recurring") from Years 1-4 that continue into Year 5.

***Identify if non-recurring.

Faculty and Staff Summary

Total Positions	Year 1	Year 5
Faculty (person-years)	1.37	3.52
A & P (FTE)	1	1
USPS (FTE)	0	0

Calculated Cost per Student FTE	
Year 1	Year 5
Total E&G Funding	\$466,684
Annual Student FTE	8
E&G Cost per FTE	\$58,335
	\$35,691

Table 2 Column Explanations

Reallocated Base* (E&G)	1	E&G funds that are already available in the university's budget and will be reallocated to support the new program. Please include these funds in the Table 3 - Anticipated reallocation of E&G funds and indicate their source.
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Enrollment Growth (E&G)	2	Additional E&G funds allocated from the tuition and fees trust fund contingent on enrollment increases.
New Recurring (E&G)	3	Recurring funds appropriated by the Legislature to support implementation of the program.
New Non-Recurring (E&G)	4	Non-recurring funds appropriated by the Legislature to support implementation of the program. Please provide an explanation of the source of these funds in the budget section (section III. A.) of the proposal. These funds can include initial investments, such as infrastructure.
Contracts & Grants (C&G)	5	Contracts and grants funding available for the program.
Philanthropy Endowments	6	Funds provided through the foundation or other Direct Support Organizations (DSO) to support of the program.
Enterprise Auxiliary Funds	7	Use this column for continuing education or market rate programs and provide a rationale in section III. B. in support of the selected tuition model.
Subtotal columns 1+...+7	8	Subtotal of values included in columns 1 through 7.
Continuing Base** (E&G)	9	Includes the sum of columns 1, 2, and 3 over time.
New Enrollment Growth (E&G)	10	See explanation provided for column 2.
Other*** (E&G)	11	These are specific funds provided by the Legislature to support implementation of the program.
Contracts & Grants (C&G)	12	See explanation provided for column 5.
Philanthropy Endowments	13	See explanation provided for column 6.
Enterprise Auxiliary Funds	14	Use this column for continuing education or market rate programs and provide a rationale in section III. B. in support of the selected tuition model.
Subtotal columns 9+...+14	15	Subtotal of values included in columns 9 through 14.

APPENDIX A

TABLE 3
ANTICIPATED REALLOCATION OF EDUCATION & GENERAL FUNDS*

Program and/or E&G account from which current funds will be reallocated during Year 1	Base before reallocation	Amount to be reallocated
College of Science Faculty	\$4,640,748.35	\$75,279.81
College of Medicine Faculty	\$3,125,560.63	\$35,797.84
College of Engineering and Computer Science	\$1,301,874.03	\$22,564.47
Wilkes Honors College	\$531,486.12	\$5,359.38
College of Education	\$216,180.67	\$944.34
Brain Institute Education Administrative Assistant	\$66,738.00	\$66,738.00
Recruiting, Advertising, brochure costs	\$20,000.00	\$20,000.00
Graduate Teaching Assistantships, Stipend Suppl, Insurance	\$382,618.12	\$382,618.12
Totals	\$10,285,205.92	\$609,301.96

* If not reallocating funds, please submit a zeroed Table 3

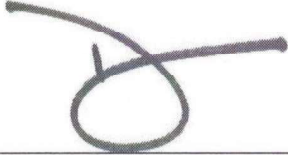
Base after reallocation	
	\$4,565,468.54
	\$3,089,762.79
	\$1,279,309.56
	\$526,126.74
	\$215,236.33
	\$66,738.00
	\$20,000.00
	\$382,618.00
	\$10,145,259.96

APPENDIX A
TABLE 4
ANTICIPATED FACULTY PARTICIPATION

Faculty Code	Faculty Name or "New Hire" Highest Degree Held Academic Discipline or Specialty	Rank	Contract Status	Initial Date for Participation in Program	Min. Contract Year 1	FTE Year 1	% Effort for Prg. Year 1	PY Year 1	Min. Contract Year 5	FTE Year 5	% Effort for Prg. Year 5	PY Year 5	Salary	Benefits	Salary + Benefits	PY Year 1 Budget	PY Year 5 Budget
A	Khanoui, Andy, Ph.D. Zoomation	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.0375	0.03	75,439.35	22,631.81	98,071.16	735.53	2,758.25
A	Verter, Robert, Ph.D. Psychology	Professor	Tenured	Fall 2021	9	0.75	0.13	0.09	9	0.75	0.1625	0.12	114,087.47	34,228.24	148,315.71	13,904.41	18,075.73
A	Yarita, Carmen, Ph.D. Psychology	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.13	0.09	9	0.75	0.225	0.17	79,325.40	23,797.62	103,123.02	9,667.78	17,402.01
A	Mama, Michael, Ph.D. Psychology	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.13	0.09	9	0.75	0.13	0.09	78,120.87	23,436.26	101,557.13	9,520.98	9,520.98
A	Godschewegg, Janna, Ph.D. Biological Sciences	Professor	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.1725	0.13	92,906.32	27,871.90	120,778.22	905.84	15,625.68
A	Wu, Jia-Yun, Biomedical Science	Professor	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.13	0.13	166,753.14	50,025.94	216,779.08	-	37,097.39
A	DawsonScully, Kim Biological Sciences	Professor	Tenured	Fall 2021	9	0.75	0.11	0.08	9	0.75	0.11	0.08	175,600.00	52,080.00	225,680.00	0.00	18,618.60
A	Clairborne, Brenda, PhD Biological Science	Professor	Tenured	Fall 2021	9	0.75	0.06	0.05	9	0.75	0.06	0.05	120,826.02	36,248.08	157,074.10	7,342.89	7,362.89
A	Tr. Zhong-qi, Ph.D. Biological Science	Professor	Tenured	Fall 2021	12	1.00	0.01	0.01	12	1.00	0.07	0.07	122,000.17	36,600.05	158,600.22	1,586.00	11,498.52
A	Nedankantawamy, P. (Ph.D.) Comp. Elec. Eng. & CompSci	Professor	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.06	0.05	126,153.78	37,846.13	163,999.91	-	7,687.50
A	Assoc. Regent, Ph.D. Comp. Elec. Eng. & CompSci	Assistant Prof.	Tenure-earning	Fall 2021	9	0.75	0.06	0.05	9	0.75	0.06	0.05	112,200.00	33,660.00	145,860.00	6,837.19	6,837.19
A	Dr. Andrew Olanikov, BiomedS Biomedical Science	Professor	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.06	0.06	131,465.60	39,439.68	170,905.28	-	10,681.58
A	Collier, Kathleen, Ph.D. Biomedical Science	Asst. Prof.	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.26	0.26	99,500.00	29,850.00	129,350.00	0.00	33,934.38
A	Shan, Wen, Ph.D. Biomedical Science	Asst. Prof.	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.06	0.06	99,500.00	29,850.00	129,350.00	-	8,084.38
A	Tao, Rui, D.D.M., Ph.D. Ph.D. Biomedical Science	Asst. Prof.	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.06	0.06	100,992.50	30,297.75	131,290.25	-	8,205.64
A	Isgur, Caylan Biomedical Science	Asst. Prof.	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.10	0.10	99,500.00	29,850.00	129,350.00	-	12,935.00
A	Wei, Jianing, Ph.D. Biomedical Science	Asst. Prof.	Tenured	Fall 2021	12	1.00	0.04	0.04	12	1.00	0.0375	0.04	96,000.00	28,800.00	124,800.00	0.00	4,680.00
A	Yin Zhong-qi, Ph.D. Biomedical Science	Asst. Prof.	Tenured	Fall 2021	12	1.00	0.04	0.04	12	1.00	0.1	0.10	140,000.00	42,000.00	182,000.00	6,825.00	18,200.00
A	Quan Ning, Ph.D. Biomedical Science	Professor	Tenured	Fall 2021	12	1.00	0.01	0.01	12	1.00	0.11	0.11	160,000.00	48,000.00	208,000.00	2,080.00	22,880.00
A	Brenner, Steven, Ph.D. Psychology	Professor	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.06	0.05	124,184.46	37,255.34	161,439.80	0.00	7,567.49
A	Hong, Sang, Ph.D. Psychology	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.06	0.05	9	0.75	0.1	0.08	79,151.35	23,745.41	102,896.76	0.00	7,717.26
A	Wahed, Ronny Biomedical Science	Professor	Tenured	Fall 2021	12	1.00	0.05	0.05	12	1.00	0.125	0.09	323,136.00	96,940.00	420,076.00	21,003.84	39,382.20
A	Anzures, Grizelle, Ph.D. Psychology	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.04	0.03	9	0.75	0.10	0.08	79,590.60	23,877.18	103,467.78	2,910.03	7,760.08
A	Wolgin, David, Ph.D. Psychology	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.06	0.05	147,974.00	44,392.29	192,366.59	0.00	9,617.18
A	Sherevaldo, Summer, Ph.D. Psychology	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.06	0.05	9	0.75	0.10	0.08	79,151.35	23,745.41	102,896.76	4,823.29	7,717.26
A	Rosselli, Monica, Ph.D. Psychology	Professor	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.0475	0.04	147,549.16	44,264.75	191,813.91	1,438.60	6,833.37
A	Hahn, William, Ph.D. Mathematics	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.10	0.08	67,626.00	20,287.80	87,913.80	-	6,593.54
A	Zhu, Xiangnan, Ph.D. Comp. Elec. Eng. & CompSci	Professor	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.07	0.05	118,052.74	35,415.82	153,468.56	1,131.01	8,344.85
A	Alexander, William, Ph.D. Psychology	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.11	0.08	9	0.75	0.11	0.08	73,556.28	22,066.88	95,623.16	7,888.91	7,888.91
A	Fashair, Ramon, Ph.D. Comp. Elec. Eng. & CompSci	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.10	0.08	151,250.00	45,375.00	196,625.00	1,474.69	14,746.85
A	Miyoco, Eiji, Ph.D. Comp. Elec. Eng. & CompSci	Professor	Tenured	Fall 2021	9	0.75	0.0625	0.05	9	0.75	0.06	0.05	133,700.13	40,137.04	173,837.17	8,152.84	8,152.84
A	Berenholtz, Elin, Ph.D. Psychology	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.0725	0.05	9	0.75	0.11	0.08	78,896.61	23,668.98	102,565.59	5,577.00	8,461.66
A	Cherant, Behnaz, Ph.D. Comp. Elec. Eng. & CompSci	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.04	0.03	9	0.75	0.04	0.03	135,350.32	40,005.10	175,355.42	4,948.75	4,948.75
A	Dinash, Ali, Ph.D. Comm. Sciences and Disorders	Professor	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.0475	0.11	96,855.82	29,056.75	125,912.57	944.34	13,850.38
A	Peters, Corinne, Ph.D. Comm. Sciences and Disorders	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.06	0.05	69,437.00	20,831.10	90,268.10	-	4,231.32
A	Wilson, Teresa, Ph.D. Psychology	Professor	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.04	0.03	190,000.00	57,000.00	247,000.00	-	6,946.88
A	Murphy, Rod, Ph.D. Biological Sciences	Professor	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.04	0.03	175,000.00	52,500.00	227,500.00	-	6,598.44
A	Robshaw, Janet Biomedical Science	Professor	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.0375	0.04	220,000.00	66,000.00	286,000.00	-	16,725.00
A	Milton, Sarah, Ph.D. Biological Sciences	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.04	0.03	130,000.00	39,000.00	169,000.00	-	4,753.13
A	Tull, Larry, Ph.D. Biomedical Science	Asst. Prof.	Tenure-earning	Fall 2021	12	1.00	0.01	0.01	12	1.00	0.0475	0.05	200,000.00	60,000.00	260,000.00	2,600.00	12,350.00
A	Carwell, Liana, Ph.D. WHC Math and Sciences	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.05	0.04	137,957.04	41,387.11	179,344.15	1,345.08	6,389.14
A	Kowalski, Johnna, Ph.D. WHC Math and Sciences	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.085	0.06	78,000.00	23,400.00	101,400.00	-	6,466.74
A	Dubois, Erik, Ph.D. WHC Math and Sciences	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.04	0.03	9	0.75	0.0375	0.03	79,590.60	23,877.18	103,467.78	2,910.03	2,910.03
A	Kewes, Alex, Ph.D. Biological Science	Professor	Tenured	Fall 2021	9	0.75	0.04	0.03	9	0.75	0.075	0.06	137,256.18	41,206.85	178,463.03	5,022.09	10,644.17
A	Sackman, Robert, Ph.D. Psychology	Professor	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.04	0.03	155,000.00	46,500.00	201,500.00	-	5,667.19
A	Jin, Kai-feng Biological Sciences	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.01	0.01	80,425.10	24,126.93	104,552.03	784.13	784.13
A	Anderson, Rindy, Ph.D. Biological Sciences	Asst. Prof.	Tenure-earning	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.04	0.03	71,098.21	21,317.46	92,375.67	-	2,598.07
A	Fields, Craig, Ph.D. Chemistry and Biochemistry	Professor	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.04	0.04	270,326.50	81,097.95	351,424.45	-	13,178.42
A	Grant, Patrick, Ph.D. Biomedical Science	Asst. Prof.	Tenured	Fall 2021	12	1.00	0.00	0.00	12	1.00	0.04	0.04	170,000.00	51,000.00	221,000.00	-	8,287.50
A	Ventura, Howard, Ph.D. Biomedical Science	Professor	Tenured	Fall 2021	12	1.00	0.01	0.01	12	1.00	0.01	0.01	131,000.00	39,300.00	170,300.00	1,703.00	1,703.00
A	Kelso, A.J. Scott, Ph.D. Psychology	Professor	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.01	0.01	236,071.28	70,821.38	306,892.66	2,301.69	2,301.69
A	Kerston, Alan, Ph.D. Psychology	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.04	0.03	78,925.45	23,677.64	102,603.09	-	2,885.71
A	Jones, Nancy, Ph.D. Psychology	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.0475	0.04	77,206.03	23,161.81	100,367.84	752.76	3,579.60
A	Cudde, Fredrag, Ph.D. Chemistry and Biochemistry	Professor	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.04	0.03	183,748.00	55,124.40	238,872.40	-	6,718.29
A	Du, Dequn, Ph.D. Chemistry and Biochemistry	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.04	0.03	89,296.17	26,788.85	116,085.02	870.64	3,264.89
A	Wachob, Craig, Ph.D. WHC Math and Sciences	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.01	0.01	9	0.75	0.0475	0.04	115,257.84	33,977.53	147,235.19	1,104.26	5,245.25
A	Rajni, Mahas, Ph.D. Comp. Elec. Eng. & CompSci	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.0475	0.04	120,000.00	36,000.00	156,000.00	-	5,537.50
A	Engberg, Erik, Ph.D. Ocean and Mech. Engineering	Asst. Prof.	Tenured	Fall 2021	9	0.75	0.00	0.00	9	0.75	0.0475	0.04	104,644.59	31,393.38	136,037.97	-	4,846.35
A	Emmanuel, Tognoli, Ph.D. Psychology	R. Assoc.															

APPENDIX B

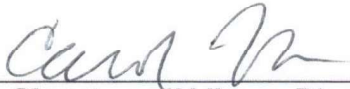
Please include the signature of the Equal Opportunity Officer and the Library Director.



11/12/2020

**Signature of Equal Opportunity
Officer**

Date



11/15/20

Signature of Library Director

Date

This appendix was created to facilitate the collection of signatures in support of the proposal. Signatures in this section illustrate that the Equal Opportunity Officer has reviewed section II.E of the proposal and the Library Director has reviewed sections X.A and X.B.

Appendix C: Data to Support the Need for an Additional Program

Currently, the Graduate Program in Neuroscience at Florida State University (FSU) in Tallahassee is the only SUS institution operating under the 26.1500 CIP code, is closest among state programs, public or private, to the FAU program in terms of program content, and meets the criteria of being 60% similar or more. Program distinctions are provided in the main proposal text.

As there is only a single program operating under CIP 26.1500, and each program admits a limited number of students each year (8-12/Yr for the FAU program, a similar number for the FSU program) and each program receives many times this many qualified applicants, there is clear demand for a second program, regardless of distinctions. Clearly the field is brimming with significant numbers of suitable applicants for both programs.

With respect to campus demand for students, we note the following points:

1) The FAU Complex Systems and Brain Sciences Ph.D. program will merge into the proposed FAU NGP upon its creation. This program admitted 15 students over the past 5 years. Significant faculty recruitment in the area of neuroscience represented by this Ph.D. program (Theoretical and Computational Neuroscience is planned over the next 5-10 years. We project that for these faculty to each host 1 student at our program's steady-state, 25 students will need to have been recruited over a 50-Yr period. As we propose a program of 48 students at the 5-Yr steady-state point, an increased number of new trainees will need to be recruited to keep pace with this growth.

2) Our proposal notes 66 faculty members as qualified mentors for trainees. With the opening of new research building in Jupiter in the spring of 2022, an additional 15 neuroscientists are projected to be hired. Other space on the Boca campus should allow for a hiring of additional 5-10 additional neuroscience faculty. Thus, we expect a total of 85-90 faculty associated with the NGP by 2030. The current Ph.D. programs at FAU with neuroscience concentrations, CSBS, XPSY, and IB- NS recruited 46 students over the past 5 years. Thus, the latter three programs are unlikely to be able to satisfy the demand for trainees. Graduate students form the majority of the workforce in university neuroscience laboratories. We have demonstrated that the GNTP which will cease with the formation of the NGP receives 5-6X as many applications from qualified students as it selects, with the pool size likely to grow substantially with the generation of a Neuroscience Ph.D. program at FAU. Thus, we believe that creation of the NGP is both needed to meet the demand for graduate students interested in a career in neuroscience and will draw more than sufficient numbers of applicants to meet its recruitment goals.

3) The demand for neuroscience graduate program opportunities by prospective students is very strong. As noted in the proposal, in 2017, 23% of all PhD degrees obtained nationally were awarded in the life sciences, with the biological and biomedical sciences accounting for 15.5% of this the total pool. Enrollment in all Biological Sciences graduate programs increased by 8.8% from 2010-17, whereas enrollment in programs within the subdiscipline of Neuroscience increased 46% during this time, making it the fastest growing field of study in the life sciences⁵. The number of doctoral degrees in Neuroscience/Neurobiology conferred nationally each year between 2012-2018 have averaged over a thousand⁶. Extramural funding for students enrolled in Neuroscience doctorate programs has kept pace with the enrollment growth. As we illustrated, NIH financial support of Neuroscience graduate students, provided through institutional program training grant awards and individual fellowships, has also increased significantly since 2007, denoting an intense educational and financial commitment to the discipline and a realization that the US was undertraining in this area. At the state level, as the proposed NGP will only be the second Neuroscience Ph.D. program statewide operating under CIP 26.1500, significant unmet opportunities to train in neuroscience at the doctoral level beyond the single existing program at FSU. As noted in the letter from the FSU Neuroscience program Director, Dr. Lisa Eckel, the development of the FAU NGP is likely to increase awareness of Florida as a destination for graduate training in neuroscience for other programs, including the FSU program.

**EXTERNAL REPORT
FOR FLORIDA ATLANTIC UNIVERSITY
NEUROSCIENCE GRADUATE PROGRAM PROPOSAL**

Daniel N. Cox, PhD

Professor of Neuroscience and Biology, Director of the Center for Neuromics, Director of Graduate Studies in Neuroscience, Georgia State University (GSU)

Lucas Pozzo-Miller, PhD

Professor of Neurobiology, Co-Director Comprehensive Neuroscience Center, Co-Director Neuroscience Theme, Graduate Biomedical Sciences, University of Alabama at Birmingham (UAB)

January 22, 2021

OVERVIEW

The team of Drs. Cox and Pozzo-Miller reviewed the proposal of a new PhD program in Neuroscience and met virtually with the following key personnel on January 21, 2021:

Dr. Bob Stackman, Dean of the Graduate College

Dr. Teresa Wilcox, Interim Dean of the College of Science

Dr. Randy Blakely, Executive Director, FAU Brain Institute

Dr. Dan Flynn, Vice President for Research

Dr. Bret Danilowicz, Provost

INTRODUCTION

The FAU Brain Institute has prepared a well-designed and detailed proposal to offer a state-of-the-art graduate program awarding a PhD in Neuroscience. The Neuroscience Graduate Program (NGP) will meet the demands of PhD-level graduates capable to contribute to local, regional, and national research efforts at the fundamental, translational, and clinical levels at academic medical centers and universities; private biotech companies; education sectors; and government sectors. Neuroscience research and education is of critical importance for the overall health of local, regional, and national communities as well as their economies. The field of Neuroscience has evolved into a highly interdisciplinary research activity bridging disciplines as diverse as molecular & cellular biology with computational modeling, and exploiting experimental models from invertebrates to non-human primates as well as humans. Training the next generation of Neuroscientists requires a modern pedagogical approach where the student is the centerpiece of the educational experience, that exposes students to diverse disciplines in intensive research environments where peer interactions promote cross-fertilization of ideas and approaches.

The proposal provides a detailed description of the program, degree requirements, need of the program, supply/demand analysis of graduates from the program, and the financial support for students throughout their time in the program.

The proposed curriculum contains the standard elements of successful PhD-level graduate programs across the country: didactic course work, rotations during the 1st year prior to selecting a laboratory for the dissertation work, qualifying examination, and final defense of the dissertation. In addition, students are required to have their dissertation work published in peer-reviewed Neuroscience journals.

The FAU Brain Institute and its faculty members that will be mentors of students in the proposed Neuroscience Graduate Program are funded by extramural agencies as well as by FAU to support students and their research expenses throughout their time in the program. Having motivated graduate students actively engaged in a PhD-level program will help in faculty recruitment and retention, in addition to contribute to acquiring extramural and research expenditures. Moreover, the addition of this PhD-level program will raise the national profile of FAU as well as serve the state of Florida, particularly in the southeast.

This report provides our opinion on the rationale, design, and implementation of this new PhD-level Neuroscience Graduate Program, as well as our suggestions based on our combined experience at GSU and UAB.

Appropriateness of the Proposed Degree Program

1. In your professional opinion, please comment on perceived student demand for the proposed program. What type of student would be interested in this program? What type of employment would be available to the student following graduation? Is both the student demand for the program and potential job market sustainable for this degree program into the foreseeable future?

There is a continued demand for PhD-level neuroscientists at the national, FL state, and local levels (including FAU Brain Institute, Max Planck Florida, and Scripps Florida): enrollment in Neuroscience programs increased 46% during 2010-2017, making it the fastest growing field of study in the life sciences. These PhD-level neuroscientists are supported in their research mentor labs by federal funding agencies (e.g. NIH, NSF, DoD, VA), which has kept pace with student enrollment in these type of programs. Student demand is also evident by the significant increase in undergraduate-level programs with a focus on Neuroscience across the country, including 3 in Florida (FAU, FSU, and FIU). Graduates from these undergraduate Neuroscience programs are a major source of students for the proposed PhD-level Neuroscience Graduate Program.

Graduates from the proposed PhD Neuroscience Program, like those from similar programs across the country, will be employed as postdoctoral researchers in academic medical centers or private biotech companies, as well as being attractive recruits as educators, government agencies, and healthcare consulting firms. Those advancing in the academic path, will be prepared to lead their independent laboratories funded by federal funding agencies, and those interested private biotech companies could advance to middle-to-upper management of their Research & Development activities.

The job market for PhD-level Neuroscientists has steadily grown since the Presidential Declaration of the “*Decade of the Brain*” in 1989, and the White House BRAIN Initiative (*Brain Research through Advancing Innovative Neurotechnologies*) of 2013. These US government initiatives have been reflected in a significant increase in federal funding for Neuroscience research, which support labs where the graduates of the proposed PhD Neuroscience Program will find a sustained source of PhD-level jobs. Furthermore, the establishment of the Scripps Florida and Max Planck Florida research institutes within the FAU Jupiter campus, in addition to the new building that will house the FAU Brain Institute, offers a sustained source of PhD-level jobs for graduates of the proposed PhD Neuroscience Program. The fact that both Scripps Florida and Max Planck Florida research institutes are partners of the with proposed PhD Neuroscience Program together the FAU Brain Institute will ensure that its graduates are trained to the expectations of those labs for PhD-level postdoctoral researchers.

2. Is the proposed body of curriculum appropriate for the job skills needed for the professions referenced above? What unfilled need or gap would the degree program fill in the workforce?

The Neuroscience Graduate Program (NGP) proposed curriculum is directly informed by best practices in graduate training in the discipline and well-aligned to the needs of the evolving neuroscience workforce as laid out by the Society for Neuroscience Training Committee. The curriculum addresses core competencies with emphases on foundational conceptual knowledge acquisition; research skill development; rigorous training in responsible conduct of research; communication skills; and professionalism. The proposed 72 credit hour degree program is organized around 21 credits of core course work; 9 elective credits specifically tailored to the trainee’s interest; 18 credits of flexible elective or research credits; and 24 dissertation credits. Students will consult with their faculty advisor(s) to select appropriate courses beyond the core requirements and dissertation credits. Within the 21 credits of required core coursework, all students will complete three 8-week research internships (rotations) in the laboratories of program faculty prior to selecting a faculty advisor for their dissertation research. In addition to formalized instruction in scientific communication, students will also develop a thesis proposal written in the format of fellowship/grant application and present this to their thesis committee in a seminar-style public forum open to all faculty and students as a key component of their advancement to PhD candidacy. The degree program culminates in the successful writing and public defense of their thesis by years 5-6. Finally, in addition to the formalized curriculum, trainee preparation for the workforce is further augmented by the breadth of relevant professional and technical skills workshops available to NGP students and offered on a regular basis to develop soft and technical skills critical to career preparation and advancement.

Industry-driven competencies were identified and incorporated into the curriculum through multiple sources. In a report prepared by an outside consultant (Hanover Research), an analysis of 2019 job postings revealed that communication and data

analysis skills were among the most important traits sought by employers in science and technology, together with collaborative team skills, strong organization skills, and high self-motivation. These findings are further corroborated by independent published works on “Neuroscience Training for the 21st century” (Akil et al., 2016, *Neuron* 90:971-926) and online publication on “20 Transferrable Skills for PhDs” by Hankel and Sur whose analyses emphasized skills needed in the biotechnology, biomedical, and biopharmaceutical industries. Skills identified in these works include data, time and project management, leadership/mentoring skills, creative problem solving, state-of-the-art technical skills, and strategic planning. NGP trainees develop these skills through a combination of formalized coursework, research training, and faculty mentorship.

The importance of neuroscience research and training, as well as advancing the pipeline of trainees in this field is evident at all levels. As highlighted in the report by Hanover Research, the proposed NGP program addresses an area of strong local, state and national need. Nationally, neurological diseases affect more than 100 million Americans at a cost of \$800 billion to society and with an ever-increasing prevalence of neurological conditions and age-related disorders, there has been major investments in federal funding in neuroscience-related research through programs such as the BRAIN Initiative and 21st Century Cures Act. The increased burden of neurological disease also dramatically impacts the Florida state population where the prevalence of diagnoses (at any age) was 4.88% compared to a national average of 2.79%.

The Hanover Research report on market analysis for neuroscience-related job availability revealed a strong market out to 2026 with increases projected at a faster than average rate whether evaluating state, regional, or national statistics with unemployment rates averaging 1.6% in both Florida and the U.S. for graduates in the neuroscience discipline. Job growth is also projected to grow by 6.1% between 2019 and 2029 thereby exceeding the national average of 3.7% for Medical Scientists. While the US Bureau of Labor Statistics does not explicitly survey neuroscience in their analyses (see Table 2), an analysis of 2700 Neuroscience Ph.D. graduates conducted in 2013 discovered that at 6-10 years post-graduation, 55% were employed in academic and 35% were employed in industry, government, and other areas of science (Akil et al., 2016, *Neuron*, 90:817-926). Florida Department of Employment Opportunity projects double-digit job growth between now and 2027 in neuroscience-related professions (e.g. medical scientists and post-secondary educators) and 67% of jobs in Florida created between 2018 and 2025 will require postsecondary degree training or special certification. These trends likewise hold true at the local level (Southeast Florida job market; Table 5 and 6 of proposal) and are further supported by data provided using the Burning Glass data analysis platform for neuroscience CIP codes revealing both significant demand and employment potential in the state of Florida for neuroscience graduates.

Student demand for PhD degrees in neuroscience is very strong. In the period from 2010-17, enrollment in Biological Sciences graduate programs increased by 8.8%, while enrollment in programs within the neuroscience subdiscipline increased by 46% during this same time period (see Table 7). For current neuroscience-relevant graduate programs at FAU (XPSY/IB-NS/CSBS/GNTP), over the past three years there were 344

applicants of which 94 were admitted and 46 students who enrolled among which nearly 40% were in the GNTP. Collectively, these data are indicative of significant student interest, and in particular strong growth in the GNTP which serves as the precursor program to the NGP which is the basis of the current proposal and which would fold in to that NGP degree program.

3. Does the proposed degree program seem to fit with the institutional goals and mission (strategic plan) of the institution?

The proposed PhD Neuroscience Program fits very well with FAU's overall goals and mission, as well as those of the FAU Brain Institute. In fact, the FAU Brain Institute was created to support research and educational activities in Neuroscience, one of the four Pillars for future research and educational investment as stated in FAU's 2015 Strategic Plan *Race to Excellence*. Therefore, the proposed PhD Neuroscience Program is a culmination of the educational mission envisioned for the FAU Brain Institute.

Institutional Readiness to Successfully Offer the Degree Program

4. Does FAU have adequate faculty numbers and expertise/credentials to successfully implement the program? Is the faculty research active enough to successfully mentor doctoral students?

A total of 59 faculty will participate in the NGP and are stratified across multiple departments reflecting the interdisciplinary nature of neuroscience research and training as well as the three major program emphasis areas: (1) cellular, molecular and biomedical neuroscience; (2) sensorimotor, cognitive and behavioral neuroscience; and (3) theoretical and computational neuroscience.

Colleges/Departments of participating faculty include: Biomedical Science (16 faculty); Psychology (16 faculty); Biological Sciences (8 faculty); College of Electrical Engineering & Computer Science (7 faculty); Wilkes Honors College: Math & Sciences (4 faculty); Chemistry & Biochemistry (3 faculty); Communication Sciences & Disorders (2 faculty); Mathematics (1 faculty); Exercise Science & Health (1 faculty); and Ocean & Mechanical Engineering (1 faculty).

These faculty members provide adequate expertise and credentials to successfully implement the program and provide the requisite breadth of expertise to foster training in the three major program emphasis areas. The faculty are research active engaging in scholarly publishing, grant writing, and securing extramural grant funding.

5. Are the institutional, College, and Department resources adequate to support the degree program? (i.e., Library, funding for students, research labs and equipment, etc.)

Laboratory facilities committed to the proposed PhD Neuroscience Program include those of the FAU Brain Institute, Scripps Florida, and Max Planck Florida, all located in the Jupiter campus.

Research core facilities operated by the FAU Brain Institute, Scripps Florida, and Max Planck Florida include behavioral and neuroanatomical analyses of transgenic animals; electron, confocal, and super-resolution microscopy; optogenetic manipulations in freely moving transgenic animals; high-throughput drug screening to develop new brain disease medications; genomics and proteomics resources to uncover disease risk factors; and solving 3-D structures of neural proteins. Access to these state-of-the-art core facilities represents a unique, 3-way partnership that leverages millions of dollars of Florida state investments in the training of FAU's students. Technical workshops and regular use of these facilities will provide an outstanding training experience for students enrolled in the proposed PhD Neuroscience Program.

FAU has extensive libraries in each campus, including Jupiter, containing physical and electronic collections of books, book series, and peer-reviewed journals that students can access 24 hours a day. The Jupiter campus also has sufficient classrooms, teaching labs, and offices for program administrators and faculty.

6. Do you feel strong support for the degree program from the College and upper-level administration?

We felt strong support for the degree program at the College and upper-level administration. The Dean of the College of Science as well as Dean of the Graduate College expressed full-throated support for the program which was echoed in our conversations with the Vice President for Research and Provost. The program is a major priority and future strength of the FAU Brain Institute and has strong leadership and vision from the Executive Director of the FAU Brain Institute.

The program is clearly aligned to the University strategic plan and there is significant investment and resource allocation to support program implementation and success.

7. What are the major strengths of FAU to successfully offer this degree program?

The establishment of the Scripps Florida and Max Planck Florida research institutes within the FAU Jupiter campus, in addition to the new building that will house the FAU Brain Institute is the major strength of the proposed PhD Neuroscience Program. As mentioned in the letters of support, the presence of the Scripps Florida and Max Planck Florida research institutes across the street of the new FAU Brain Institute building in the FAU Jupiter campus is reminiscent of the highly successful campus of UCSD with the Scripps and Salk research institutes in close proximity and housing UCSD graduate students and employing UCSD graduates in their research labs.

FAU's undergraduate Neuroscience and Behavior major offered by the Department of Psychology is another major strength of FAU to offer this new

Neuroscience PhD. Enrollment in this undergraduate major has grown steadily, and its graduates will be a major source of students for the proposed PhD Neuroscience Program.

8. What will be the major challenges of FAU to successfully offer this degree program?

We did not identify any insurmountable challenges FAU will face in implementing the Neuroscience PhD degree program based upon our conversations with the executive director of the FAU Brain Institute, college administration and upper administration.

Challenges that the University is aware of, and has taken steps to address, include those of a distributed campus model (Jupiter, Boca Raton, Davie); faculty diversity/inclusion, including gender balance; and reputational challenges as FAU further ramps up their regional and national research standing. Each of these has potential impacts on recruiting top graduate talent and building a cohesive environment. To address the distributed campus challenge, FAU has established a free intercampus Wi-Fi enable shuttle service between the Jupiter and Boca Raton campuses which will enable NGP students to access courses and seminars as well as collaborate across campuses. The FAU Brain Institute has also developed a targeted marketing strategy with dedicated funding to advertise the program on a broad scale and to support the Neuroscience Seminar series which will bring leaders in the field to the FAU campus promoting important exchanges between students and faculty that enrich the intellectual and training environment.

SUGGESTIONS

1. Add a written component to the Qualifying Examination, which can be used as the basis for an extramural funding submission by the student (e.g. NRSA from NIH). Offer a monetary reward for those students submitting their written proposals defended at the Qualifying Examination to a funding agency (e.g. \$500 at UAB)
2. Add clarity and details regarding the source of funding support for those students necessitating more time than the allotted 5 years.
3. Remove the requirement for the GRE entirely; i.e. making it optional still could give the impression that it will be used to evaluate candidates. This recommendation is based on evidence-based studies and best practices in holistic graduate recruitment and may further serve to enhance diversity and inclusion within the program.
4. Clarify that the requirement for published articles before the final defense also include papers "in press".
5. Add clarity and details to the different options to exit the PhD-level program with an intermediate degree (e.g. Master's).

6. Create a seminar series for just the students in the proposed PhD Neuroscience Program, or use the summer months of an existing seminar series to focus on student speakers (e.g. practicing short talks at meetings like the Annual Neuroscience Meeting of the SfN).

7. Negotiate a waiver of the application fee, at least for students in need or from minoritized groups in STEM.

8. Add clarity and details regarding the new proposal to integrate with Broward Health hospitals for their academic mission focused on Neuroscience, which will dovetail very well with FAU Brain Institute's mission on clinical and translational Neuroscience research (aka "bench-to-bedside).

CONCLUDING REMARKS

FAU is ready to implement the proposed graduate program awarding a PhD in Neuroscience. The program will produce Neuroscientists that will contribute to the economic development of the state and improve the quality of life of Floridians.

Market Analysis: PhD in Neuroscience

Prepared for Florida Atlantic University

December 2019



In the following report, Hanover assesses demand for PhD programs in neuroscience specifically highlighting demand trends in Florida. This report includes an examination of student and labor market demand, as well as an analysis of potential competitor programs.

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<u>Competitor Analysis</u>	<u>Page 7</u>
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Executive Summary

Market Analysis: PhD in Neuroscience

Recommendations

Based on an analysis of degree completions, labor market demand, and market competitors, Hanover recommends that Florida Atlantic University (FAU):

- 1 **Proceed with the proposed PhD in Neuroscience.** Student demand trends and growth in the neuroscience field indicate that the program will be viable. While professions in academia remain particularly competitive, relevant occupations are expected to grow.
- 2 **Ensure students receive sufficient training in statistics, data analysis, and communication to best prepare them for both academic and non-academic careers.** [Scientific American](#) notes that neuroscience graduates increasingly pursue non-academic career paths. Meanwhile, a 2016 article in the peer-reviewed journal *Neuron* "[Neuroscience Training for the 21st Century](#)" highlights educational gaps in statistics, data analytics, and communication. The prevalence of communication and data analysis as preferred skills among reviewed job postings confirms these findings.

Key Findings and Program Demand Forecast

For neuroscience programs in Florida

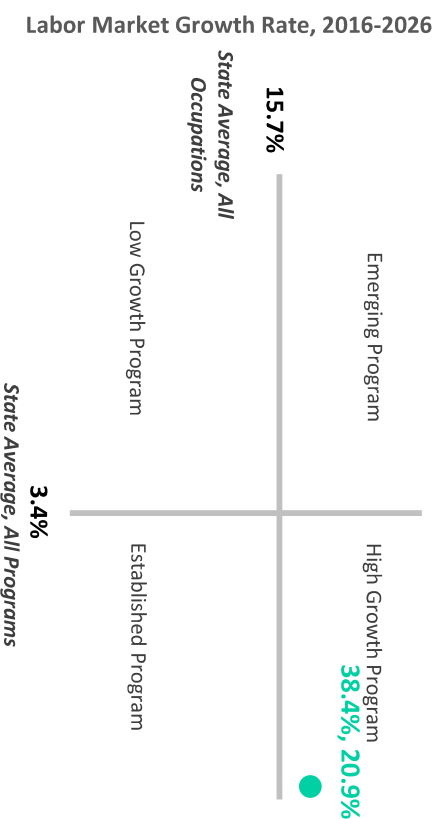
Though neuroscience doctoral conferral volumes are low, the field is growing rapidly. As of 2017, there were only 11 neuroscience PhD completions in Florida, but these grew from 3 completions in 2013. Coupled with expansion of the neuroscience field as a whole, FAU can anticipate a growing prospective student pool for a new neuroscience program.

Jobs for program graduates are increasing, but the growing number of graduates has created a competitive labor market. While the number of related positions are expected to increase at above-average rates from 2016 to 2026, the insecurity and limitations of academic funding have created new pressures for a growing number of job candidates. Demand for graduates, particularly those with strong analytical and communication skills, is high.

FAU's proposed program features, particularly the delayed lab entry, will help distinguish the PhD to prospective students. No reviewed institutions offer delayed lab entry, and only two provide master's pathways. This suggests FAU will be able to distinguish itself in a generally favorable market.

Florida Benchmark Analysis

Comparison of neuroscience completions and relevant labor market to all completions and all occupations in Florida



Fast Facts



4

Total number of neuroscience doctorate programs in Florida reporting conferrals in 2017



30,000

Anticipated attendance for the Society for Neuroscience 2019 Convention



4

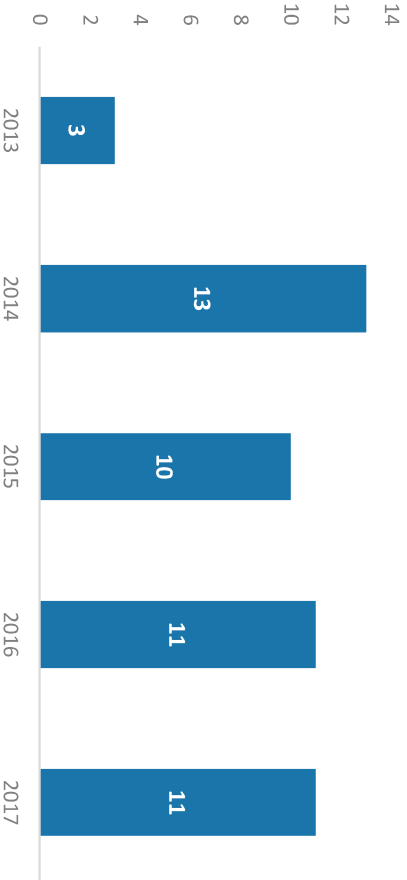
Number of reviewed programs with guest speaker series

Degree Completions Analysis

Market Analysis: PhD in Neuroscience

Florida Degree Completions Volume

Distribution of doctoral research degree completions in Florida from 2013 to 2017 (Neuroscience Only)



Total Degree Completions

Aggregate degree completions by geographic level (2017)

	Florida	Southeast	National
Neuroscience	11	83	651
Neurobiology and Neurosciences, Other	0	0	6
Neuroanatomy	0	0	--
Neurobiology and Anatomy	0	9	54
Neurobiology and Behavior	0	4	15
Neuropharmacology	0	0	--
Total	11	96	726
Average Annualized Growth Rate	38.4%	4.7%	2.4%

Source: [IBEDS](#)

Note: Southeast includes AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV.

Analysis of Findings

PhD completions in fields related to neuroscience have grown above-average from 2013 to 2017.

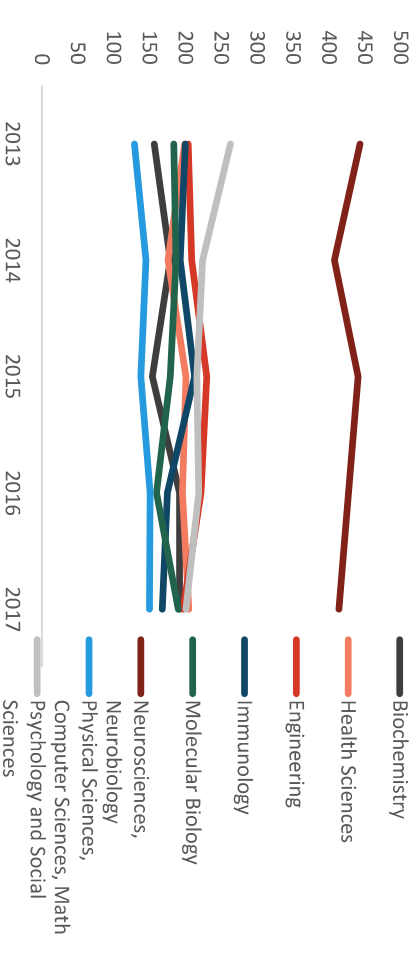
State-wide, regionally, and nationally, relevant completions volumes are low but growing quickly when compared to all programs at the doctoral level (38.4 vs. 3.4 percent in Florida, 4.7 vs. 4.0 percent in the Southeast, and 2.4 vs. 2.3 percent in the United States). Notably, neuroscience doctoral programs account for the majority of completions at each geographic level.

Over the last decade, interest in neuroscience PhDs has outpaced other biomedical and scientific fields.

As demonstrated in the chart below, neuroscience is now the most popular field among National Institutes of Health (NIH)-supported PhD recipients. In fact, [Scientific American](#) refers to a “flood of doctoral students choosing neuroscience.”

While this upswing in demand bodes well for future programs, neuroscience graduates may face some gaps in their education. Key areas where graduates require more training are quantitative and statistical skills, data analytics, and verbal/communication skills (“[Neuroscience Training for the 21st Century](#)”).

Major Fields of Study for NIH-Supported PhDs



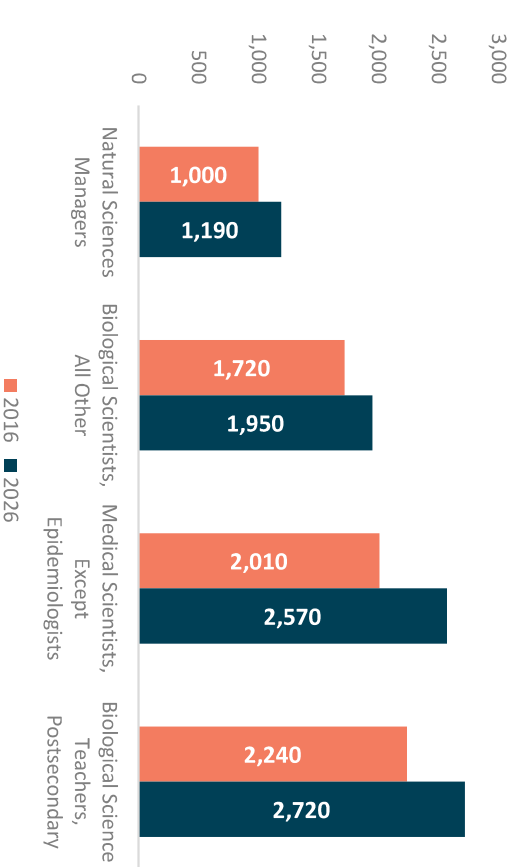
Source: Adapted directly from [NIH Data Book](#)

Labor Market Analysis

Market Analysis: PhD in Neuroscience

Florida Current and Projected Job Availability

Neuroscience-related positions in Florida as of 2016 and 2026 (projected)



Total Labor Market

Aggregate neuroscience-related job availability by geographic level

	Florida	Southeast	National
Estimated Employment (2016)	6,970	38,930	277,700
Projected Employment (2026)	8,430	45,300	311,900
Employment Growth	20.9%	16.4%	12.3%
Total Annual Openings	750	3,980	27,000

Source: [Projections Central](#)

Note: Southeast includes AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV.

Analysis of Findings

Associated occupations are projected to increase at a faster-than-average rate over the next 10 years.

From 2016 to 2026, the Bureau of Labor Statistics (BLS) projects professions for PhDs in neuroscience will grow faster than the average rate for all occupations at the state, regional, and national levels. In addition to significant employer demand for these roles, students with this credential will enjoy a positive job outlook.

Uncertain funding will increase the competitiveness of the labor market.

[Scientific American](#) notes that many neuroscience doctoral candidates become discouraged by fluctuations in grants and funding; while “actual demand for understanding the brain is huge... there isn’t an infinite amount of money.” Students are beginning to choose career paths outside of academia, with fewer neuroscience PhD graduates working in universities. Students are likely recognizing the high levels of competition within academia and are attracted to the careers related to their degree – for example, those related to scientific writing, public policy, and industry (“[Neuroscience Training for the 21st Century](#)”).

The Society for Neuroscience (SfN) has grown significantly over the last 50 years and remains committed to pursuing funding for the neuroscience field.

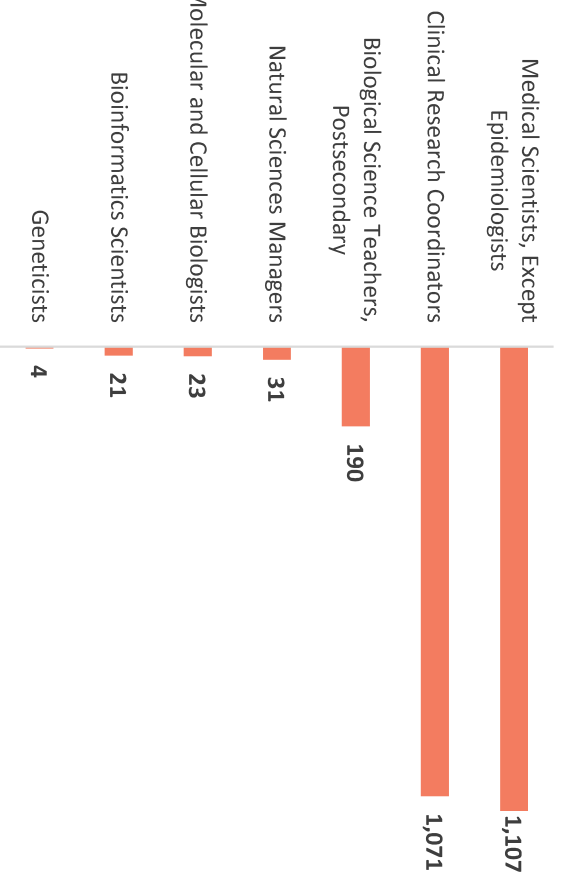
[SfN](#) currently represents over 37,000 neuroscientists of over 80 nationalities. While the Society’s first convention attracted only 1,395 participants, the 2019 convention is anticipated to reach almost 30,000 attendees. Furthermore, this event is “one of the world’s largest annual scientific meetings.” This expansion has allowed SfN to push for greater funding, such as the Neuroscience Scholars Program (a travel grant) the Trainee Professional Development Award (also a travel grant) and the Increasing Women in Neuroscience Initiative (funding to recruit and maintain female and other underserved students).

Real-Time Job Postings Intelligence

Market Analysis: PhD in Neuroscience

Florida Job Postings Analysis

Neuroscience-related positions in Florida by occupational group during the past 180 days as of November 2019. Includes detailed occupational codes for which long-term projections are unavailable.



Florida Employment Facts

Neuroscience-related positions in Florida by occupational group

Occupation	Average Salary		Unemployment Rate	
	Florida	U.S.	Florida	U.S.
Natural Sciences Managers	\$126,200	\$139,700	1.1%	1.2%
Biological Scientists, All Other	\$71,200	\$83,600	1.5%	1.7%
Medical Scientists, Except Epidemiologists	\$83,000	\$96,400	1.5%	1.7%
Biological Science Teachers, Postsecondary	\$90,800	\$97,300	2.2%	2.5%

Source: JobsEQ and BLS; Skills lists exclude Microsoft proficiencies

Analysis of Findings

Florida employers posted nearly 2,500 jobs related to neuroscience over the last six months.

Medical Scientists, Except Epidemiologists compose the highest number of postings, followed by *Clinical Research Coordinators*. Most positions are in labs, and the frequency of *Clinical Research Coordinators* implies many roles also include administrative or managerial tasks in addition to research. [Scientific American](#) supports this finding by reporting that labs will need more “coordination and oversight of neuroscience research cores” to synthesize findings in such a highly interdisciplinary field.

Employers seek applicants with communication and data analysis skills.

These skills frequently appear in postings, confirming that statistics, data analysis, and communication are desired attributes for neuroscience PhD graduates (“[Neuroscience Training for the 21st Century](#)”).

Top Hard Skills in Reviewed Postings	Top Soft Skills in Reviewed Postings
<ul style="list-style-type: none"> • Clinical Research – 708 • Health/Wellness – 277 • Molecular Biology – 274 • Teaching/Training, School – 165 • Data Analysis – 156 	<ul style="list-style-type: none"> • Communication (Verbal and Written) – 1,142 • Cooperative/Team Player – 1,008 • Accountable/Responsible – 545 • Self-Motivated – 533 • Organization – 479

The [Society for Neuroscience](#) returned eight results for “neurojobs” in Florida.

Six positions are doctoral or postdoctoral roles. There are two positions in Tallahassee and Miami, and one position Boca Ration, Gainesville, Jacksonville, and Tampa, respectively. Though neuroscience is not specifically mentioned in [Florida’s 2018-2023 Strategic Plan for Economic Development](#), healthcare and life sciences is listed as one of the “state’s growing and diverse industries.” Similarly, [Investopedia](#) ranks life sciences, which includes “biomedical research institutes, pharmaceutical and medical device companies, and more than 46,000 healthcare establishments” as one of Florida’s six primary industries.

Competitor Analysis

Market Analysis: PhD in Neuroscience

Competitor Analysis

Based on an analysis of state peers, Hanover concludes the following:

Market conditions favor a new neuroscience PhD.

Relevant conferrals and growth in student demand have increased over the last five years. Though overall conferral volume is relatively low and no new programs opened from 2013 to 2017, conferral growth and FAU's existing resources in the field suggest the proposed neuroscience program is viable. Moreover, data from [Scientific American](#) and the [NIH](#) demonstrate that neuroscience is currently one of the most popular PhD programs in the sciences.

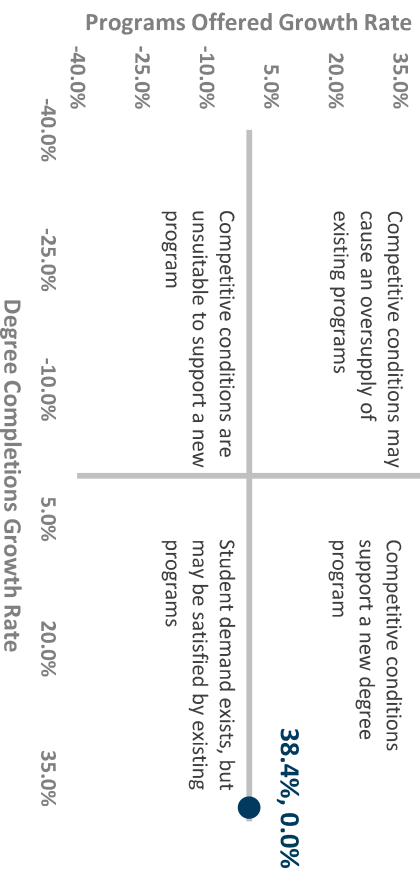
To provide a detailed analysis of the competitive landscape, Hanover reviewed all neuroscience PhD programs in Florida as well as programs in the Southeast region reporting the highest 2017 conferrals. Of the ten reviewed programs, the review revealed only four competitor programs located in Florida.

List of Reviewed Programs

Institution	Location	Notable Features
Duke University	NC	PhD in Neurobiology
Florida International University	FL	PhD in Cognitive Neuroscience
Florida State University	FL	PhD in Neuroscience
Georgia State University	GA	PhD in Neuroscience
University of Alabama - Birmingham	AL	PhD Neuroscience
University of Miami	FL	PhD in Neuroscience
University of North Carolina - Chapel Hill	NC	PhD in Neuroscience
University of South Florida	FL	PhD in Medical Sciences: Neuroscience Concentration
University of Virginia	VA	PhD in Neuroscience
Vanderbilt University	TN	PhD in Neuroscience

Florida Market Saturation (2013-2017)

Do competitive conditions in Florida support an additional neuroscience program?



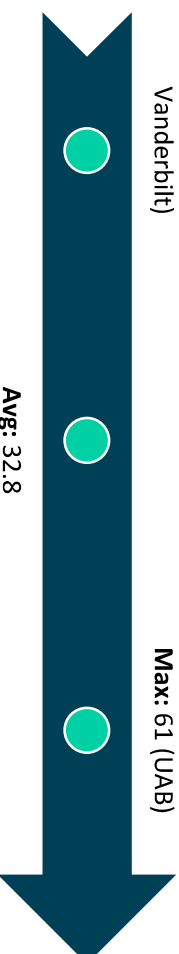
Non-Research Credits

Reviewed programs require between 24 and 61 non-research credits, averaging nearly 33 total credits.

All but one competitor program (University of Alabama-Birmingham) requires 36 or fewer classroom credits. FAU should plan for a similar focus on research rather than coursework in its proposed program.

Min: 24 (UNC, UVA, Vanderbilt)

Max: 61 (UAB)



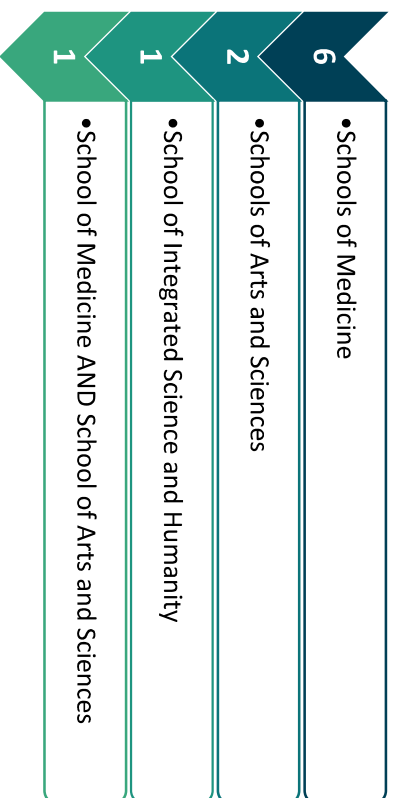
Competitor Analysis

Market Analysis: PhD in Neuroscience

Academic Housing

The majority of reviewed programs are housed in schools of medicine, confirming FAU's multi-college approach is a differentiating feature.

FSU is the only other institution to explicitly mention cross-college collaboration, which draws neuroscience PhD faculty from both the College of Arts and Sciences and the College of Medicine. While [UNC Chapel Hill](#) notes that its neuroscience PhD faculty encompass 15 various departments and research centers, all are from the School of Medicine.



Specializations

Georgia State University, University of Virginia, and Vanderbilt University offer specializations in their neuroscience doctorates.

More common than cross-college collaboration, concentrations are still relatively rare. Furthermore, no reviewed institution offers FAU's proposed concentrations.



Master's Pathways

Only two reviewed programs offer master's pathways—Florida State University and Georgia State University.



FSU's master's pathway is optional and requires approval from the student's major professor and supervisory committee. Only Georgia State has a guaranteed master's path similar to FAU's planned structure.

Notable Features

The most commonly advertised notable features among reviewed programs are lecture series, unique facilities, and interdisciplinary program structure. FAU's proposed program is highly interdisciplinary, and the [FAU Brain Institute](#) provides opportunities to advertise facilities. FAU should consider leveraging relationships with Max Planck and Scripps Florida to develop a guest speaker series.

Lecture Series

- Four institutions provide seminar or lecture series with guest speakers

Unique Facilities

- UAB notes students' access to the Dauphin Island Sea Lab, USF markets connects to the USF Neuroscience Institute and Center of Excellence for Aging and Brain Repair

Interdisciplinary

- USF highlights its cross-college and cross-departmental structure, and UAB notes that students have access to all labs in the Graduate Biomedical Sciences program, regardless of their chosen theme

Program Benchmarking

Market Analysis: PhD in Neuroscience

Market Analysis: PhD in Neuroscience Benchmarking

Hanover has reviewed all neuroscience PhD programs in Florida as identified through IPEDS and an internet scan as well as programs in the Southeast reporting high 2017 conferral volumes.

Institution	Location	Program	Specializations	Academic Housing	Master's Pathway?	Non-Research Credits	Notable Features
Duke University	NC	PhD in Neurobiology	--	School of Medicine	No	33*	<ul style="list-style-type: none"> • Collaboration with other departments • Annual retreat • Weekly seminars and lunches with guest speakers
Florida International University	FL	PhD in Cognitive Neuroscience	--	School of Integrated Science and Humanity	No**	36	<ul style="list-style-type: none"> • Emphasis on grant-writing skills
Florida State University	FL	PhD in Neuroscience	--	College of Arts and Sciences and College of Medicine	Yes (optional, subject to approval)	30***	<ul style="list-style-type: none"> • Interdisciplinary: faculty are from the biological science, psychology, mathematics, and biomedical science departments
Georgia State University	GA	PhD in Neuroscience	Neuroethics	College of Arts and Sciences	Yes	28	<ul style="list-style-type: none"> • Brains and Behavior program offers access to a graduate fellowship, lecture series, and seed grants
University of Alabama - Birmingham	AL	PhD Neuroscience	--	School of Medicine	No	61***	<ul style="list-style-type: none"> • One of eight themes available in biomedical graduate sciences; students choose a theme prior to entering the program, but have access to all faculty labs regardless of theme • Introductory course at Dauphin Island Sea Lab

Source: Institutional Websites (see embedded hyperlinks)

*Assumes 3 credits per course

**Students are required to complete a master's project, but apparently do not receive master's degrees

***Total credits minus dissertation research credits

Program Benchmarking

Market Analysis: PhD in Neuroscience

Market Analysis: PhD in Neuroscience Benchmarking

Hanover has reviewed all neuroscience PhD programs in Florida as identified through IPEDS and an internet scan as well as programs in the Southeast reporting high 2017 conferral volumes.

Institution	Location	Program	Specializations	Academic Housing	Master's Pathway?	Non-Research Credits	Notable Features
University of Miami	FL	PhD in Neuroscience	--	School of Medicine	No*	36	--
University of North Carolina - Chapel Hill	NC	PhD in Neuroscience	--	School of Medicine	No	24**	<ul style="list-style-type: none"> Weekly seminars and lunches
University of South Florida	FL	PhD in Medical Sciences: Neuroscience Concentration	--	College of Medicine	No	24	<ul style="list-style-type: none"> Affiliated with the USF Neuroscience Institute and Center of Excellence for Aging and Brain Repair
University of Virginia	VA	PhD in Neuroscience	<ul style="list-style-type: none"> Molecular, Cellular & Developmental Synapses and Circuits Neuroimmunology 	College and Graduate School of Arts and Sciences	No	31-34	<ul style="list-style-type: none"> Biweekly journal club Weekly student seminar
Vanderbilt University	TN	PhD in Neuroscience	<ul style="list-style-type: none"> Cellular and Molecular Cognitive and Systems 	School of Medicine	No	24	<ul style="list-style-type: none"> Additional PhD programs in Educational Neuroscience and Law and Neuroscience

Source: Institutional Websites (see embedded hyperlinks)

*Not typical, but master's may be granted "under special circumstances at the discretion of the Steering Committee."

**Credit values found in the Graduate Course Catalog; assumes the two required electives are worth three credits

HR HANOVER
RESEARCH



VALIDATE: EMPLOYMENT POTENTIAL

PROJECT CRITERIA

Validate	Programs
States	Florida
Degree Level	Doctoral degree
Time Period	10/1/2019 - 9/30/2020
Selected Programs	Neuroanatomy (26.1502), Neurobiology and Anatomy (26.1503), Neurobiology and Behavior (26.1504), Neurobiology and Neurosciences, Other (26.1599), Neuroscience (26.1501)
Career Outcomes mapped to Selected Programs of Study	Medical Scientist, Biologist

HOW MANY JOBS ARE THERE FOR YOUR GRADUATES?

For your project criteria, there were **1,191** job postings in the last 12 months.

Compared to:

- 2,167,753 total job postings in your selected location
- 82,603 total job postings requesting a Doctoral degree in your selected location

The number of jobs is expected to **grow** over the next 10 years.

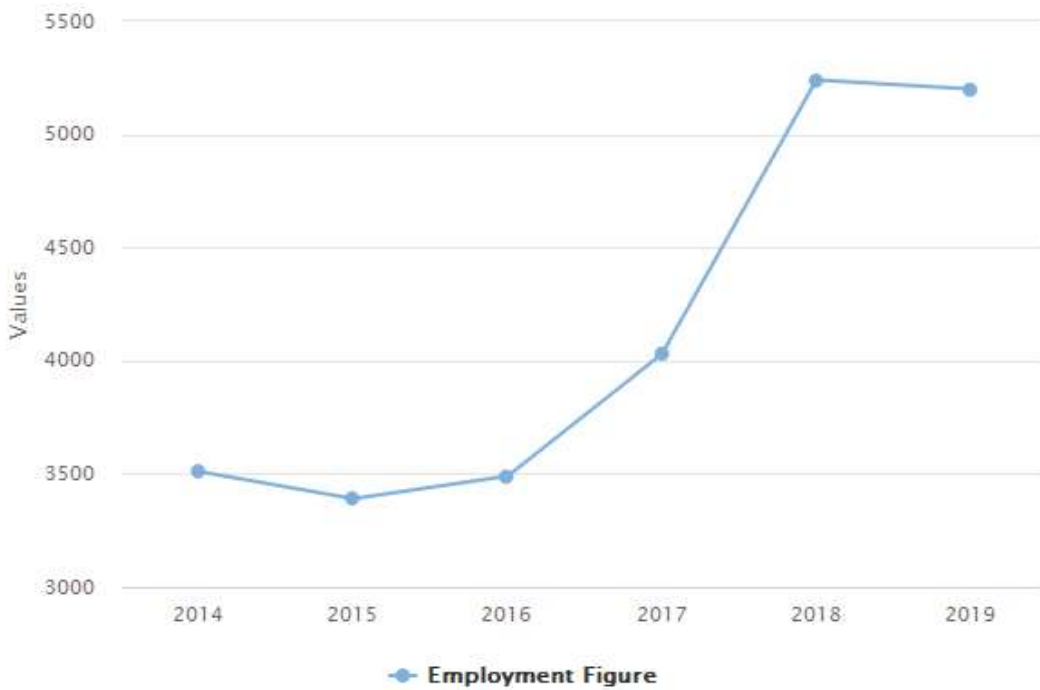
GROWTH BY GEOGRAPHY

Geography	Selected Occupations	Total Labor Market	Relative Growth
Florida	23.75 %	10.77 %	High

Nationwide	9.09 %	4.24 %	Average
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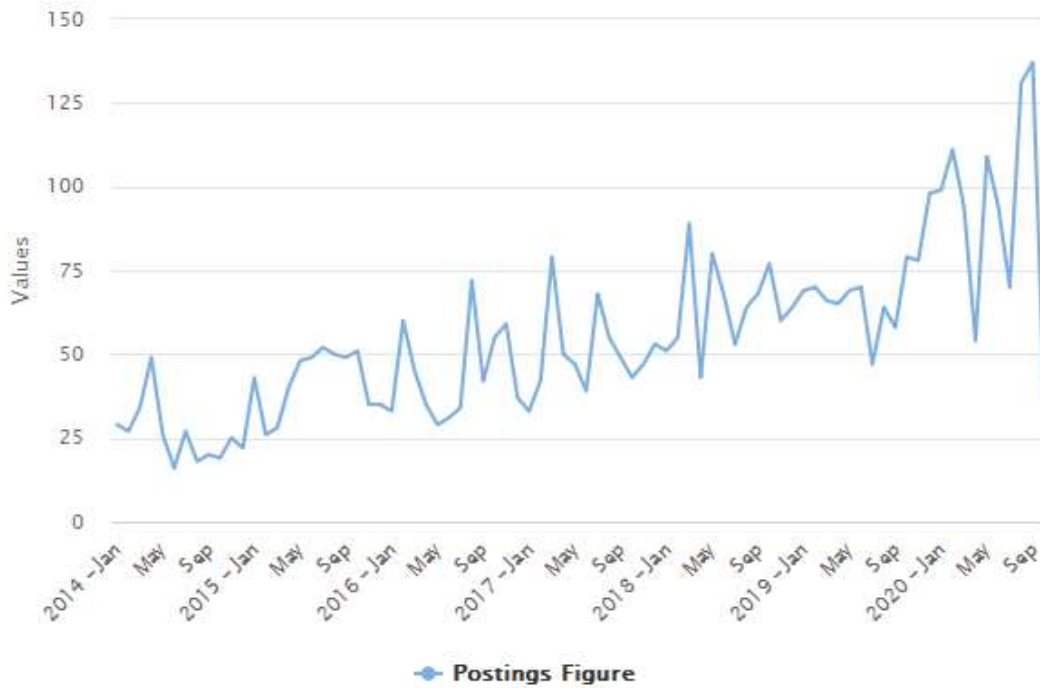
HOW HAS EMPLOYMENT CHANGED FOR CAREER OUTCOMES OF YOUR PROGRAM?

	2014	2015	2016	2017	2018	2019
Employment (BLS)	3,510	3,390	3,490	4,030	5,240	5,200



Employment data between years 2019 and 2028 are projected figures.

POSTINGS TRENDS



DETAILS BY OCCUPATION

Occupation Group	Postings	LQ	Employment (2019)	Employment Growth (2018 - 2019)	Projected Employment Growth (2019-2028)
Health and Medical Research	1,002	0.7	3,530	1.7%	25.5%
Biological Science	189	0.5	1,670	-5.6%	20.0%

HOW VERSATILE IS MY PROGRAM?

Graduates of this program usually transition into any of the 2 different occupation groups:

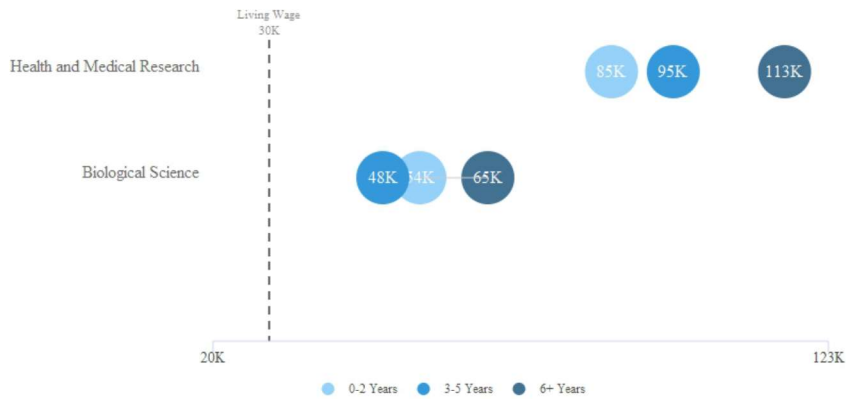
Occupations Group	Market Size (postings)	Percentage of Career Outcome demand
Health and Medical Research	1,002	84.1%
Biological Science	189	15.9%



WHAT SALARY WILL MY GRADUATES MAKE?

The average salary in Florida for graduates of your program is \$78,882

This average salary is Above the average living wage for Florida of \$29,619



Salary numbers are based on Burning Glass models that consider advertised job posting salary, BLS data, and other proprietary and public sources of information.

Occupation Group	0-2 Years	3-5 Years	6+ Years
Health and Medical Research	\$85116	\$95076	\$112893

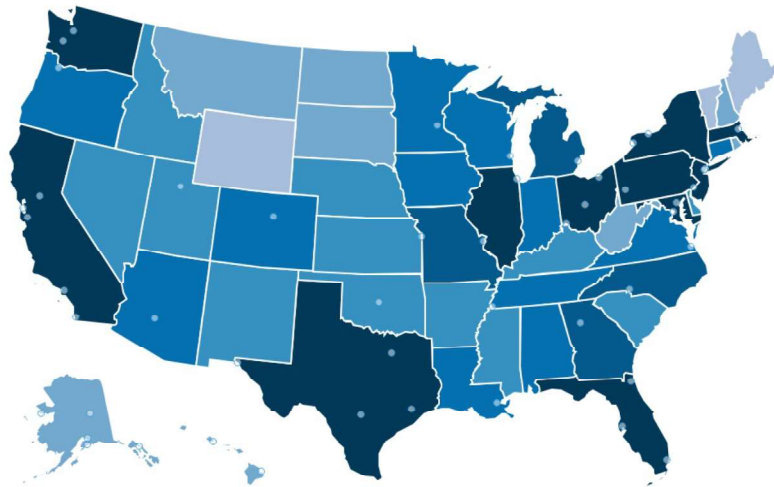
Biological Science

\$53999

\$48195

\$65286

WHERE IS THE DEMAND FOR MY GRADUATES?



TOP LOCATIONS BY POSTING DEMAND

Location	Postings
California	7,918
Massachusetts	3,246
Pennsylvania	1,757
Texas	1,747
New York	1,508
New Jersey	1,229
Florida	1,160
Ohio	1,136
Maryland	1,122
Washington	1,074

VALIDATE: COMPETITIVE LANDSCAPE

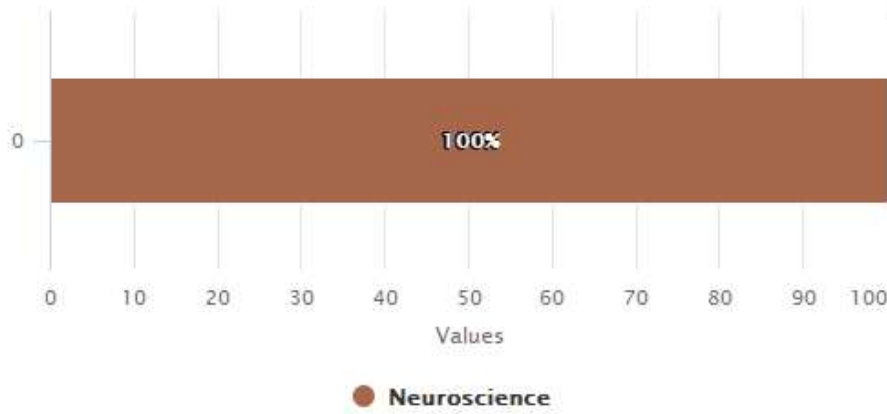
PROJECT CRITERIA

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Career Outcomes mapped to Selected Programs of Study	Medical Scientist, Biologist

OVERVIEW

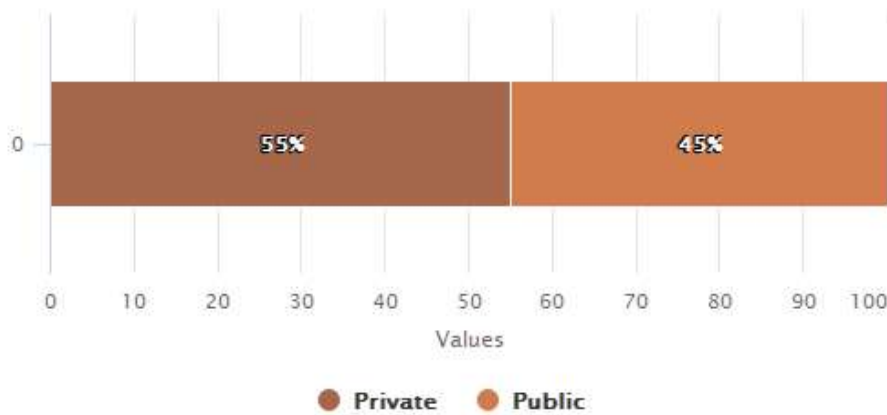
	#	% Change (2014-2018)
Degrees Conferred	11	-15%
Number of Institutions	2	0%
Average Conferrals by Institution	6	0.00%
Median Conferrals by Institution	6	0.00%

MARKET SHARE BY PROGRAM



Program	Conferrals (2018)	Market Share (%)
Neuroscience	11	100.00%

MARKET SHARE BY INSTITUTION TYPE



Institution Type	Conferrals (2018)	Market Share (%)
Private	6	54.55%
Public	5	45.45%

TOP INSTITUTIONS

Institution	School Type	Market Share (2018)	Market Share Change	Conferrals (2018)	Conferrals Change (2014-2018)
University of Miami	Private	54.55%	8.40%	6	0.00%
Florida State University	Public	45.45%	-8.40%	5	-28.60%

TOP PROGRAMS

Program	Market Share (2018)	Market Share Change	Conferrals (2018)	Conferrals Change (2014-2018)
Neuroscience	100.00%	0.00%	11	-15.40%

ACTIVE COMPETITORS

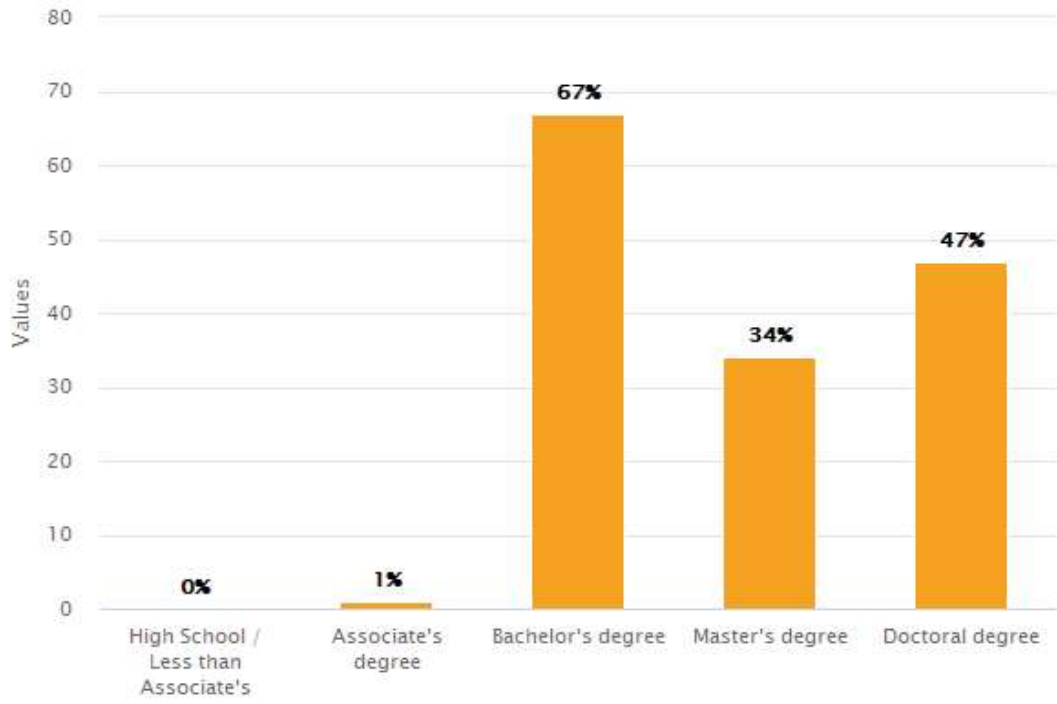
Institution	School Type	Market Share (2018)	Market Share Change	Conferrals (2018)	Conferrals Change (2014-2018)
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VALIDATE: MARKET ALIGNMENT

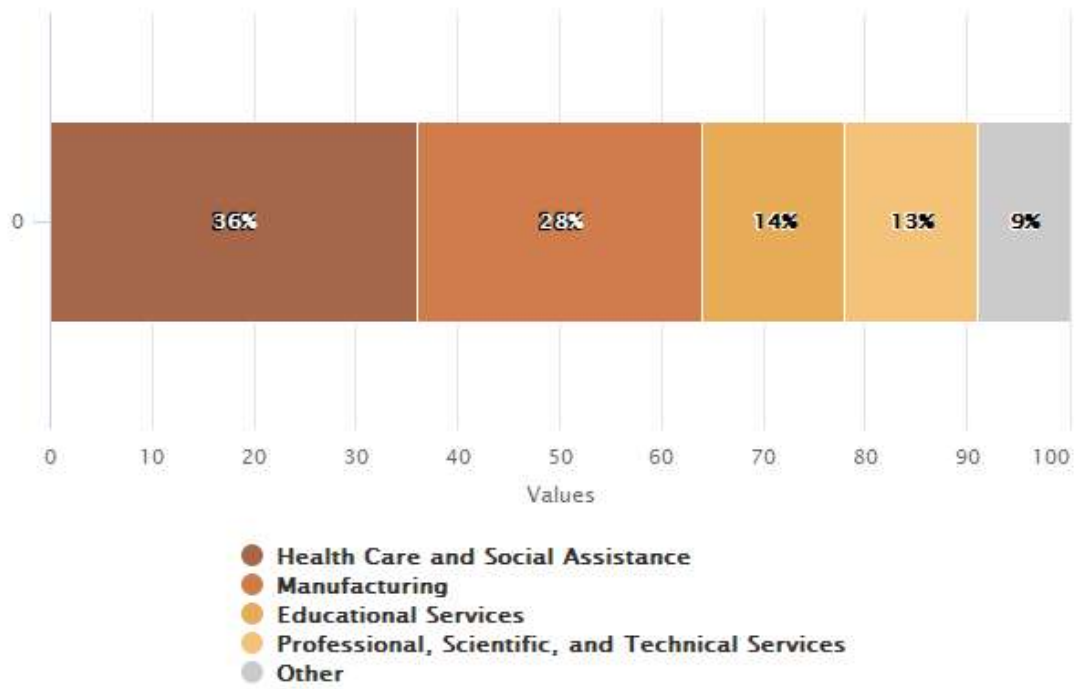
PROJECT CRITERIA

Validate	Programs
States	Florida
Degree Level	Doctoral degree
Time Period	10/1/2019 - 9/30/2020
Selected Programs	Neuroanatomy (26.1502), Neurobiology and Anatomy (26.1503), Neurobiology and Behavior (26.1504), Neurobiology and Neurosciences, Other (26.1599), Neuroscience (26.1501)
Career Outcomes mapped to Selected Programs of Study	Medical Scientist, Biologist

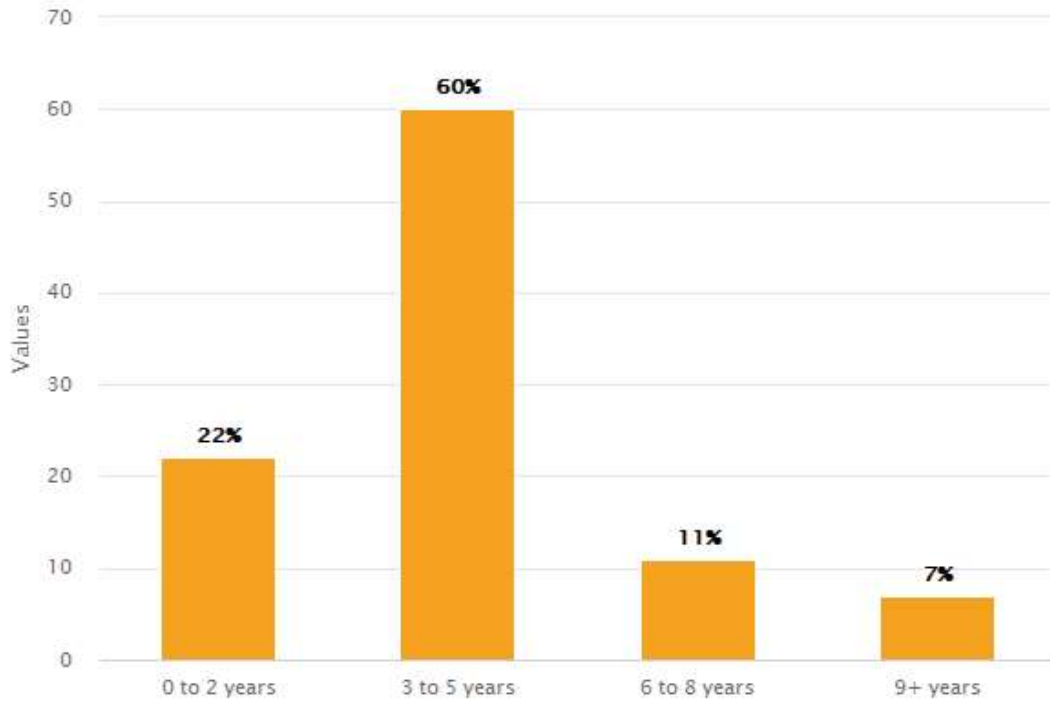
JOB POSTINGS BY ADVERTISED EDUCATION (%)



JOB POSTINGS BY INDUSTRY (%)



JOB POSTINGS BY EXPERIENCE REQUESTED (%)



TOP TITLES

Experience Level: All Experience

Title	Postings	Market Share (%)
Medical Science Liaison	39	5.16%
Medical Science Liaison II, Cardiovascular & Renal	28	3.70%
Msl II	18	2.38%
Research Entomologist	17	2.25%
Director Medical Science Liaison Msl - Hematology	11	1.46%
Medical Science Liaison III- Radiology	11	1.46%
Post-Doctoral Fellow	11	1.46%
Regional Director Medical Science Liaison Msl - Cardiorenal	11	1.46%

Senior Medical Science Liaison	11	1.46%
Senior Director Medical Science Liaison Msl - Cardiorenal	9	1.19%
Oncology Medical Science Liaison	8	1.06%
Applied Post-Doctoral Fellow	7	0.93%
Biological Scientist II	7	0.93%
Biological Scientist III	7	0.93%
Assistant Or Associate Professor Genitourinary Malignancy Research Center	6	0.79%

TOP EMPLOYERS HIRING

Experience Level: All Experience

Employer	Postings	Market Share (%)
Bayer Corporation	88	11.64%
Moffitt Cancer Center	65	8.60%
University of Florida	47	6.22%
University of Miami	34	4.50%
Sanofi Aventis	21	2.78%
H Lee Moffitt Cancer Center	20	2.65%
Amplity Health	19	2.51%
Iqvia	19	2.51%
Genentech	17	2.25%
Bestmsls	13	1.72%
Cleveland Clinic	12	1.59%
Baptist Health	11	1.46%
Johnson & Johnson	11	1.46%
Nemours	10	1.32%
Astrazeneca	9	1.19%

VALIDATE: KEY COMPETENCIES

PROJECT CRITERIA

Validate	Programs
States	Florida
Degree Level	Doctoral degree
Time Period	10/1/2019 - 9/30/2020
Selected Programs	Neuroanatomy (26.1502), Neurobiology and Anatomy (26.1503), Neurobiology and Behavior (26.1504), Neurobiology and Neurosciences, Other (26.1599), Neuroscience (26.1501)
Career Outcomes mapped to Selected Programs of Study	Medical Scientist, Biologist

TOP 15 SPECIALIZED SKILLS

Skill	Postings	Projected Growth	Salary Premium	Competitive Advantage
Medical Science	319 (28%)	5.6%	Yes	Yes
Clinical Research	212 (18%)	-22.47%	No	No
Cancer knowledge	209 (18%)	17.96%	No	No
Biology	174 (15%)	-20.99%	No	No

Clinical Trials	171 (15%)	2.37%	No	No
Project Management	159 (14%)	-19.74%	Yes	No
Budgeting	154 (13%)	-10.04%	Yes	No
Oncology	142 (12%)	15.67%	Yes	No
Experiments	130 (11%)	3.17%	No	No
Clinical Development	126 (11%)	3.78%	Yes	Yes
Molecular Biology	124 (11%)	-19.19%	No	Yes
Pharmaceutical Industry Knowledge	119 (10%)	-32.42%	No	Yes
Managed Care	115 (10%)	-6.25%	No	No
Patient Care	113 (10%)	15.79%	No	No
Training Programs	89 (8%)	-11.54%	No	No

TOP 15 BASELINES SKILLS

Skill	Postings
Research	714 (62%)
Communication Skills	460 (40%)
Teamwork / Collaboration	362 (31%)
Organizational Skills	194 (17%)
Detail-Oriented	168 (14%)
Problem Solving	165 (14%)
Microsoft Excel	156 (13%)
Written Communication	155 (13%)
Presentation Skills	152 (13%)
Building Effective Relationships	149 (13%)

Computer Literacy	148 (13%)
Planning	141 (12%)
Writing	131 (11%)
Microsoft Powerpoint	121 (10%)
Time Management	76 (7%)

TOP 15 SOFTWARE PROGRAMMING SKILLS

Skill	Postings	Projected Growth	Salary Premium	Competitive Advantage
Microsoft Excel	156 (13%)	17.03%	No	No
Microsoft Powerpoint	121 (10%)	-8.52%	No	No
Microsoft Office	74 (6%)	-10.2%	No	No
Lotus Applications	68 (6%)	-100%	No	No

Lotus Notes	68 (6%)	-100%	No	No
Microsoft Word	47 (4%)	-13.39%	No	No
Python	29 (2%)	61.12%	No	No
Customer Relationship Management (CRM)	22 (2%)	15.03%	No	No
R	17 (1%)	40.61%	No	No
MATLAB	16 (1%)	-7.53%	No	No
PERL Scripting Language	16 (1%)	-36.55%	No	No
Linux	13 (1%)	-12.57%	No	No
Data Visualization	13 (1%)	72.42%	No	No
UNIX	12 (1%)	-61.89%	No	No
Word Processing	10 (1%)	-19.34%	No	No

TOP 15 SKILL CLUSTERS

Skill	Postings
Clinical Research	442 (38%)
Medical Research	439 (38%)
Oncology	281 (24%)
Project Management	197 (17%)
Molecular Biology	190 (16%)
Laboratory Research	175 (15%)
Genetics	171 (15%)
Cellular Biology	168 (14%)
Budget Management	154 (13%)
Chemistry	145 (12%)
Drug Development	132 (11%)

Pharmaceutical Industry Knowledge	119 (10%)
Medical Support	107 (9%)
Pathology	81 (7%)
Medical Procedure and Regulation	78 (7%)

TOP 15 SALARY PREMIUM SKILLS

Skill	Postings	Projected Growth	Salary Premium	Competitive Advantage
Medical Science	319 (28%)	5.6%	Yes	Yes
Project Management	159 (14%)	-19.74%	Yes	No
Budgeting	154 (13%)	-10.04%	Yes	No
Oncology	142 (12%)	15.67%	Yes	No
Clinical Development	126 (11%)	3.78%	Yes	Yes
Thought Leadership	70 (6%)	5.96%	Yes	Yes

Genetics	60 (5%)	0.38%	Yes	Yes
Data Analysis	55 (5%)	81.86%	Yes	No
Flow Cytometry	51 (4%)	18.84%	Yes	No
Good Clinical Practices (GCP)	42 (4%)	20.42%	Yes	Yes
Infectious Disease	36 (3%)	6.08%	Yes	Yes
Drug Development	30 (3%)	0.43%	Yes	No
Drug Discovery	30 (3%)	-6.02%	Yes	No
Quality Management	27 (2%)	-10.99%	Yes	No

TOP 15 COMPETITIVE ADVANTAGE SKILLS

Skill	Postings	Projected Growth	Salary Premium	Competitive Advantage
Medical Science	319 (28%)	5.6%	Yes	Yes
Clinical Development	126 (11%)	3.78%	Yes	Yes

Molecular Biology	124 (11%)	-19.19%	No	Yes
Pharmaceutical Industry Knowledge	119 (10%)	-32.42%	No	Yes
Thought Leadership	70 (6%)	5.96%	Yes	Yes
Genetics	60 (5%)	0.38%	Yes	Yes
Teaching	56 (5%)	-12.75%	No	Yes
Pathology	48 (4%)	1.34%	No	Yes
Good Clinical Practices (GCP)	42 (4%)	20.42%	Yes	Yes
Infectious Disease	36 (3%)	6.08%	Yes	Yes
Laboratory Testing	33 (3%)	16.76%	No	Yes
Medical Management	9 (1%)	20.64%	No	Yes
Acute Care	8 (1%)	44.69%	No	Yes

Patient Safety	6 (1%)	7.76%	No	Yes
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TOP 15 CERTIFICATIONS

Skill	Postings	Salary Premium	Competitive Advantage
Driver's License	130 (11%)	No	No
Board Certified/Board Eligible	97 (8%)	No	No
Certified Registered Nurse Practitioner	80 (7%)	No	No
Registered Nurse	45 (4%)	No	No
Pharmacist License	13 (1%)	No	No
Certified Financial Planner (CFP)	9 (1%)	No	No
American Society For Clinical Pathology (ASCP) Certification	7 (1%)	No	No
Basic Life Saving (BLS)	7 (1%)	No	No
Security Clearance	7 (1%)	No	No

Certified Career Development Facilitator	5 (0%)	No	No
Clinical Laboratory Technologist	4 (0%)	No	No
Certified Clinical Research Professional	3 (0%)	No	No
Basic Cardiac Life Support Certification	3 (0%)	No	No
Microsoft Certified Professional (MCP)	2 (0%)	No	No
Certified Diabetes Educator (CDE)	2 (0%)	No	No

TOP 15 SALARY PREMIUM CERTIFICATIONS

Skill	Postings	Salary Premium	Competitive Advantage
No certificates available			

TOP 15 COMPETITIVE ADVANTAGE CERTIFICATIONS

Skill	Postings	Salary Premium	Competitive Advantage
No certificates available			