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**Title:** Academic Theses and Dissertations that Depend on the MCNP Code

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## Memorandum

**X-Computational Physics Division**  
**Monte Carlo Codes Group**

**Subject: Academic Theses and Dissertations that Depend on the MCNP Code**

Colleagues:

This memo provides a listing of graduate-level theses and dissertations that rely on the MCNP code. The documents may depend on the code's data, documentation, and/or transport capabilities to support the associated research. This listing arises from a survey of various university electronic library sites and a cursory review of each candidate thesis and dissertation to distinguish those that merely cite the MCNP code from those that rely on it in a more substantial manner (where only the latter are included here).

Because of the survey-based approach, this listing is incomplete; however, it provides insight into the incredible breadth of impact that the MCNP code has had. Unfortunately, some universities do not provide open access to their electronic thesis and dissertation collections, which further necessitates an incomplete listing herein.

To summarize the listing below: there are 752 theses and 861 dissertations from 156 universities (Tables 1 and 2) throughout the world (Table 3). The cumulative reliance on the MCNP code over time is shown in Figure 1. If the titles from these documents are used to generate a word cloud, the 100 most frequently used words, scaled by frequency and colored randomly using the colors and tints that correspond to LANL's four strategic objectives, are shown in Figure 2. The publication frequency over time for the most prolific universities is shown in Figure 3.

Other observations:

- The ASCII input file used by the MCNP code provides a *de facto* communication tool. Many documents cited herein list MCNP input files in an appendix to enable reproducibility.
- Because of the focus on electronic theses and dissertations, and the time frame over which these have typically been authored, documents from the last two decades dominate the documents listed herein. Generic (i.e., non-university affiliated) academic document search engines such as [WorldCat.org](http://WorldCat.org) suggest that there are numerous documents that could also be

listed from the 1980s and 1990s. However, because these are typically printed documents in various libraries, there is no practical way to examine the contents to ensure a consistent basis for inclusion in this listing.

- University electronic dissertation search results are generally 70–80% reliable. That is, most early search results for each university meet the (loose) criteria for inclusion in this listing and those remaining are either included as a result of merely citing the MCNP code, otherwise mentioning it as an alternative approach and/or opportunity for future work, or as a false positive (see next point).
- There are relatively few false-positive search results. However, those encountered are documents mentioning protein identifiers (e.g., mono(carboxynonyl) phthalate, a metabolite of di-isodecyl phthalate (DiDP)), membrane-coated nanoparticles, magnetic-core nanoparticles, Mammoth Cave National Park, Mount Cameroon National Park, motor cortical neural prosthetics, typos of MDNP (minimum detectable number of photons), Massachusetts Coalition of Nurse Practitioners, or the Minutier Central des Notaires de Paris. Other false positives come from electronic documents generated by failed optical character recognition processing.

Please contact me with any comments, questions, or concerns.

Thank you,

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Table 1: Summary of Theses and Dissertations by University, Alphabetically

School	Theses	Dissertations	Total
Air Force Institute of Technology	30	7	37
Aix-Marseille Université	0	1	1
Anna University	0	1	1
Aristotle University of Thessaloniki	0	1	1
Arizona State University	0	8	8
Atlanta University	1	0	1
Brigham Young University	1	1	2
Brno University of Technology	7	0	7
Carleton University	1	0	1
Case Western Reserve University	0	3	3
Chalmers University of Technology	4	0	4
Clemson University	1	2	3
Collège militaire royal du Canada	2	2	4
Colorado School of Mines	4	3	7
Colorado State University	15	1	16
Columbia University	0	2	2
Danmarks Tekniske Universitet	0	1	1
Duke University	0	1	1
Durham University	0	1	1
East Carolina University	0	1	1
Eidgenössische Technische Hochschule	1	0	1
Escuela Técnica Superior de Ingenieros Industriales	2	1	3
Georgia Institute of Technology	59	49	108
Graduate University for Advanced Studies	0	1	1
Helsinki University of Technology	0	1	1
Idaho State University	2	3	5
Illinois Institute of Technology	0	1	1
Imperial College of Science, Technology and Medicine	0	1	1
Indiana University	0	7	7
Instituto Tecnológico de Aeronáutica	1	0	1
Instituto de Engenharia Nuclear	6	2	8
Instituto de Física	2	1	3
Instituto de Pesquisas Energéticas e Nucleares	24	11	35
Iowa State University	0	1	1
Kansas State University	17	20	37
Karlsruher Institut für Technologie	0	1	1
Kungliga Tekniska Högskolan	2	0	2
Lancaster University	0	4	4
Louisiana State University	1	0	1
Massachusetts Institute of Technology	92	74	166
McGill University	1	1	2
McMaster University	7	4	11
Michigan State University	0	2	2
Mid Sweden University	2	0	2
Mississippi State University	1	0	1
Missouri University of Science and Technology	31	19	50
Montana State University	0	1	1
Nagoya University	0	1	1
National Technical University of Athens	0	1	1
National and Kapodistrian University of Athens	0	2	2
Naval Postgraduate School	4	0	4
Normandie Université	0	1	1
North Carolina State University	9	24	33
North-West University	9	0	9
Northern Illinois University	0	1	1

Continued on next page

Table 1: Summary of Theses and Dissertations by University, Alphabetically

School	Theses	Dissertations	Total
Northwestern University	0	1	1
Ohio State University	15	28	43
Ohio University	2	1	3
Oklahoma State University	0	1	1
Old Dominion University	0	1	1
Oregon State University	74	31	105
Oxford University	0	1	1
Pennsylvania State University	3	10	13
Portland State University	1	0	1
Princeton University	0	3	3
Purdue University	8	20	28
Rensselaer Polytechnic Institute	2	8	10
Rice University	0	1	1
Royal Melbourne Institute of Technology	0	1	1
San Jose State University	1	0	1
Stellenbosch University	1	0	1
Technische Universiteit Delft	1	1	2
Technische Universität Clausthal	0	1	1
Technische Universität Darmstadt	0	1	1
Technische Universität Dresden	0	2	2
Texas A&M University	107	56	163
Universidad Nacional De Colombia	1	0	1
Universidade Federal Rural de Pernambuco	1	0	1
Universidade Federal de Minas Gerais	3	8	11
Universidade de Lisboa	1	0	1
Universidade de São Paulo	0	1	1
Universidade do Estado do Rio de Janeiro	1	0	1
Universitat Politècnica de Catalunya	0	1	1
Universitat Politècnica de València	0	3	3
University of Alabama	1	0	1
University of Arizona	4	5	9
University of California	2	52	54
University of Chicago	0	7	7
University of Cincinnati	2	13	15
University of Crete	0	1	1
University of Florida	18	20	38
University of Ghana	1	2	3
University of Glasgow	0	1	1
University of Hawai'i	0	1	1
University of Idaho	4	1	5
University of Illinois	11	7	18
University of Ioannina	0	2	2
University of Iowa	0	1	1
University of Johannesburg	1	0	1
University of Kansas	0	1	1
University of Kentucky	0	2	2
University of Leicester	0	1	1
University of Liverpool	0	1	1
University of Manchester	1	0	1
University of Maryland	0	3	3
University of Massachusetts	2	1	3
University of Michigan	0	52	52
University of Minnesota	0	1	1
University of Missouri	5	17	22
University of Nevada	9	9	18
University of New Hampshire	0	1	1

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Table 1: Summary of Theses and Dissertations by University, Alphabetically

School	Theses	Dissertations	Total
University of New Mexico	21	14	35
University of North Carolina	1	1	2
University of Notre Dame	0	2	2
University of Ontario Institute of Technology	15	1	16
University of Pennsylvania	0	2	2
University of Rochester	0	1	1
University of South Carolina	2	1	3
University of Surrey	0	2	2
University of Tennessee	21	43	64
University of Texas	32	50	82
University of Toledo	9	9	18
University of Toronto	1	4	5
University of Utah	6	6	12
University of Virginia	0	1	1
University of Washington	1	1	2
University of Wisconsin	1	22	23
University of Wollongong	1	2	3
University of the Western Cape	1	0	1
Universität Basel	0	1	1
Universität Stuttgart	0	2	2
Universität Wien	1	0	1
Université Grenoble Alpes	0	6	6
Université Paris Sud	0	1	1
Université Paris-Saclay	0	1	1
Université catholique de Louvain	0	1	1
Université de Montréal	2	0	2
Université de Strasbourg	0	1	1
Université libre de Bruxelles	0	1	1
Università di Bologna	0	2	2
Univerza v Mariboru	0	1	1
Univerzitet u Novom Sadu	0	1	1
Uppsala Universitet	2	0	2
Vanderbilt University	1	1	2
Virginia Commonwealth University	4	3	7
Virginia Polytechnic Institute and State University	5	9	14
Wake Forest University	0	1	1
Washington State University	0	1	1
Washington University	0	2	2
Wayne State University	0	2	2
Weizmann Institute of Science	0	1	1
Worcester Polytechnic Institute	2	3	5
Youngstown State University	1	0	1
École des Mines de Nantes	0	1	1
École doctorale de Physique	0	2	2
École polytechnique fédérale de Lausanne	0	1	1
<b>Total</b>	<b>752</b>	<b>861</b>	<b>1613</b>

Table 2: Summary of Theses and Dissertations by University, by Total Output

School	Theses	Dissertations	Total
Massachusetts Institute of Technology	92	74	166
Texas A&M University	107	56	163
Georgia Institute of Technology	59	49	108
Oregon State University	74	31	105
University of Texas	32	50	82
University of Tennessee	21	43	64
University of California	2	52	54
University of Michigan	0	52	52
Missouri University of Science and Technology	31	19	50
Ohio State University	15	28	43
University of Florida	18	20	38
Air Force Institute of Technology	30	7	37
Kansas State University	17	20	37
Instituto de Pesquisas Energéticas e Nucleares	24	11	35
University of New Mexico	21	14	35
North Carolina State University	9	24	33
Purdue University	8	20	28
University of Wisconsin	1	22	23
University of Missouri	5	17	22
University of Illinois	11	7	18
University of Nevada	9	9	18
University of Toledo	9	9	18
Colorado State University	15	1	16
University of Ontario Institute of Technology	15	1	16
University of Cincinnati	2	13	15
Virginia Polytechnic Institute and State University	5	9	14
Pennsylvania State University	3	10	13
University of Utah	6	6	12
McMaster University	7	4	11
Universidade Federal de Minas Gerais	3	8	11
Rensselaer Polytechnic Institute	2	8	10
North-West University	9	0	9
University of Arizona	4	5	9
Arizona State University	0	8	8
Instituto de Engenharia Nuclear	6	2	8
Brno University of Technology	7	0	7
Colorado School of Mines	4	3	7
Indiana University	0	7	7
University of Chicago	0	7	7
Virginia Commonwealth University	4	3	7
Université Grenoble Alpes	0	6	6
Idaho State University	2	3	5
University of Idaho	4	1	5
University of Toronto	1	4	5
Worcester Polytechnic Institute	2	3	5
Chalmers University of Technology	4	0	4
Collège militaire royal du Canada	2	2	4
Lancaster University	0	4	4
Naval Postgraduate School	4	0	4
Case Western Reserve University	0	3	3
Clemson University	1	2	3
Escuela Técnica Superior de Ingenieros Industriales	2	1	3
Instituto de Física	2	1	3
Ohio University	2	1	3
Princeton University	0	3	3

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Table 2: Summary of Theses and Dissertations by University, by Total Output

School	Theses	Dissertations	Total
Universitat Politècnica de València	0	3	3
University of Ghana	1	2	3
University of Maryland	0	3	3
University of Massachusetts	2	1	3
University of South Carolina	2	1	3
University of Wollongong	1	2	3
Brigham Young University	1	1	2
Columbia University	0	2	2
Kungliga Tekniska Högskolan	2	0	2
McGill University	1	1	2
Michigan State University	0	2	2
Mid Sweden University	2	0	2
National and Kapodistrian University of Athens	0	2	2
Technische Universiteit Delft	1	1	2
Technische Universität Dresden	0	2	2
University of Ioannina	0	2	2
University of Kentucky	0	2	2
University of North Carolina	1	1	2
University of Notre Dame	0	2	2
University of Pennsylvania	0	2	2
University of Surrey	0	2	2
University of Washington	1	1	2
Universität Stuttgart	0	2	2
Université de Montréal	2	0	2
Università di Bologna	0	2	2
Uppsala Universitet	2	0	2
Vanderbilt University	1	1	2
Washington University	0	2	2
Wayne State University	0	2	2
École doctorale de Physique	0	2	2
Aix-Marseille Université	0	1	1
Anna University	0	1	1
Aristotle University of Thessaloniki	0	1	1
Atlanta University	1	0	1
Carleton University	1	0	1
Danmarks Tekniske Universitet	0	1	1
Duke University	0	1	1
Durham University	0	1	1
East Carolina University	0	1	1
Eidgenössische Technische Hochschule	1	0	1
Graduate University for Advanced Studies	0	1	1
Helsinki University of Technology	0	1	1
Illinois Institute of Technology	0	1	1
Imperial College of Science, Technology and Medicine	0	1	1
Instituto Tecnológico de Aeronáutica	1	0	1
Iowa State University	0	1	1
Karlsruher Institut für Technologie	0	1	1
Louisiana State University	1	0	1
Mississippi State University	1	0	1
Montana State University	0	1	1
Nagoya University	0	1	1
National Technical University of Athens	0	1	1
Normandie Université	0	1	1
Northern Illinois University	0	1	1
Northwestern University	0	1	1

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Table 2: Summary of Theses and Dissertations by University, by Total Output

School	Theses	Dissertations	Total
Oklahoma State University	0	1	1
Old Dominion University	0	1	1
Oxford University	0	1	1
Portland State University	1	0	1
Rice University	0	1	1
Royal Melbourne Institute of Technology	0	1	1
San Jose State University	1	0	1
Stellenbosch University	1	0	1
Technische Universität Clausthal	0	1	1
Technische Universität Darmstadt	0	1	1
Universidad Nacional De Colombia	1	0	1
Universidade Federal Rural de Pernambuco	1	0	1
Universidade de Lisboa	1	0	1
Universidade de São Paulo	0	1	1
Universidade do Estado do Rio de Janeiro	1	0	1
Universitat Politècnica de Catalunya	0	1	1
University of Alabama	1	0	1
University of Crete	0	1	1
University of Glasgow	0	1	1
University of Hawai'i	0	1	1
University of Iowa	0	1	1
University of Johannesburg	1	0	1
University of Kansas	0	1	1
University of Leicester	0	1	1
University of Liverpool	0	1	1
University of Manchester	1	0	1
University of Minnesota	0	1	1
University of New Hampshire	0	1	1
University of Rochester	0	1	1
University of Virginia	0	1	1
University of the Western Cape	1	0	1
Universität Basel	0	1	1
Universität Wien	1	0	1
Université Paris Sud	0	1	1
Université Paris-Saclay	0	1	1
Université catholique de Louvain	0	1	1
Université de Strasbourg	0	1	1
Université libre de Bruxelles	0	1	1
Univerza v Mariboru	0	1	1
Univerzitet u Novom Sadu	0	1	1
Wake Forest University	0	1	1
Washington State University	0	1	1
Weizmann Institute of Science	0	1	1
Youngstown State University	1	0	1
École des Mines de Nantes	0	1	1
École polytechnique fédérale de Lausanne	0	1	1
<b>Total</b>	<b>752</b>	<b>861</b>	<b>1613</b>

Table 3: Summary of Theses and Dissertations by Country

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Australia	4
Austria	1
Belgium	2
Brazil	61
Canada	41
Colombia	1
Czech Republic	7
Denmark	1
England	12
Finland	1
France	14
Germany	7
Ghana	3
Greece	7
India	1
Israel	1
Italy	2
Japan	2
Netherlands	2
Portugal	1
Scotland	1
Serbia	1
Slovenia	1
South Africa	12
Spain	7
Sweden	10
Switzerland	3
USA	1407
Total	1613

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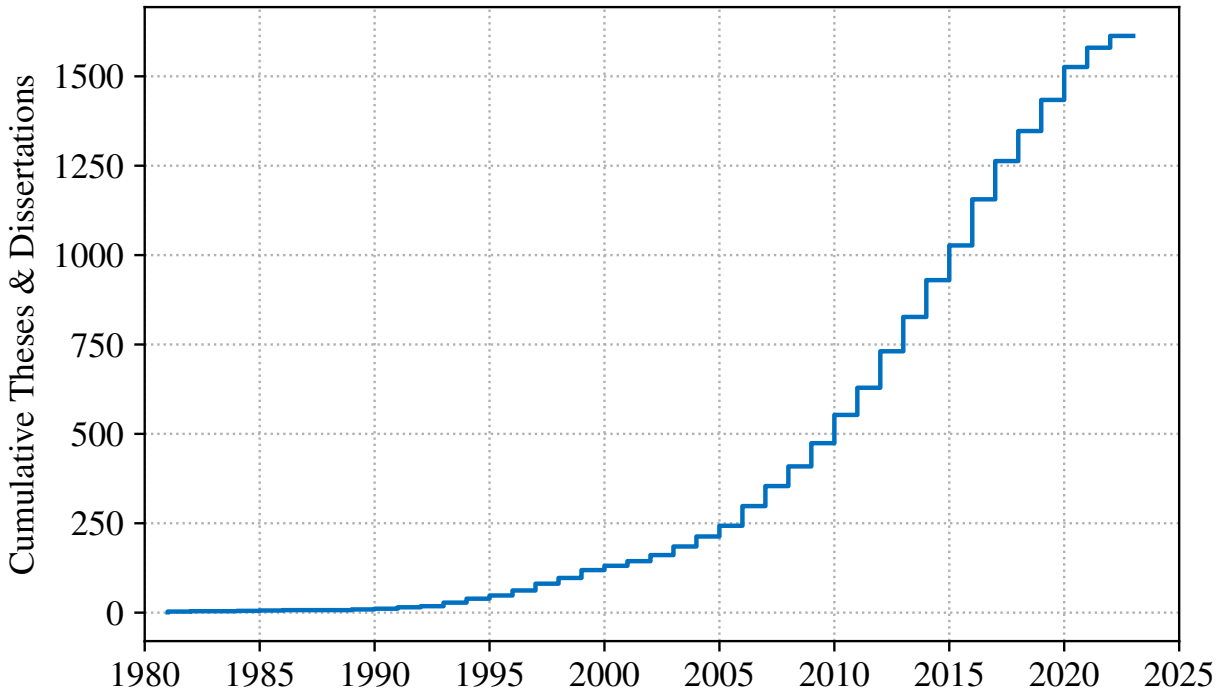


Figure 1: Cumulative Reliance on the MCNP Code versus Time

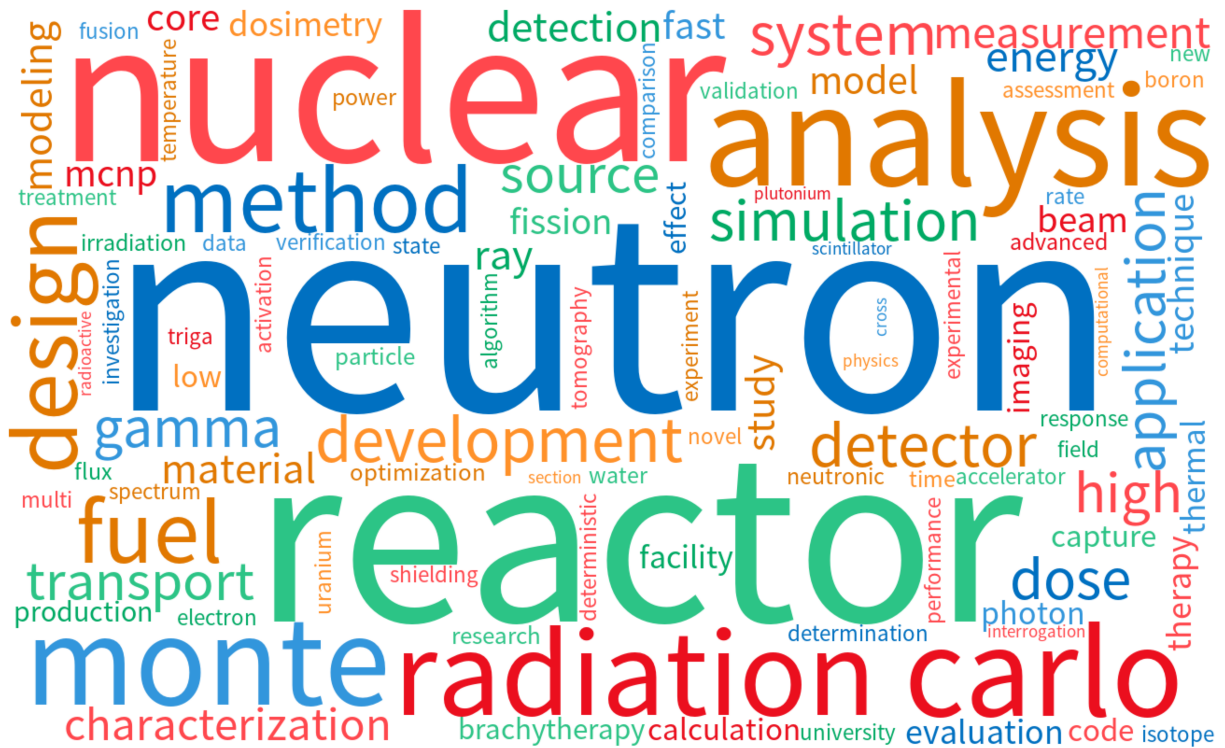


Figure 2: Word Cloud of 100 Most Frequently Used Title Words

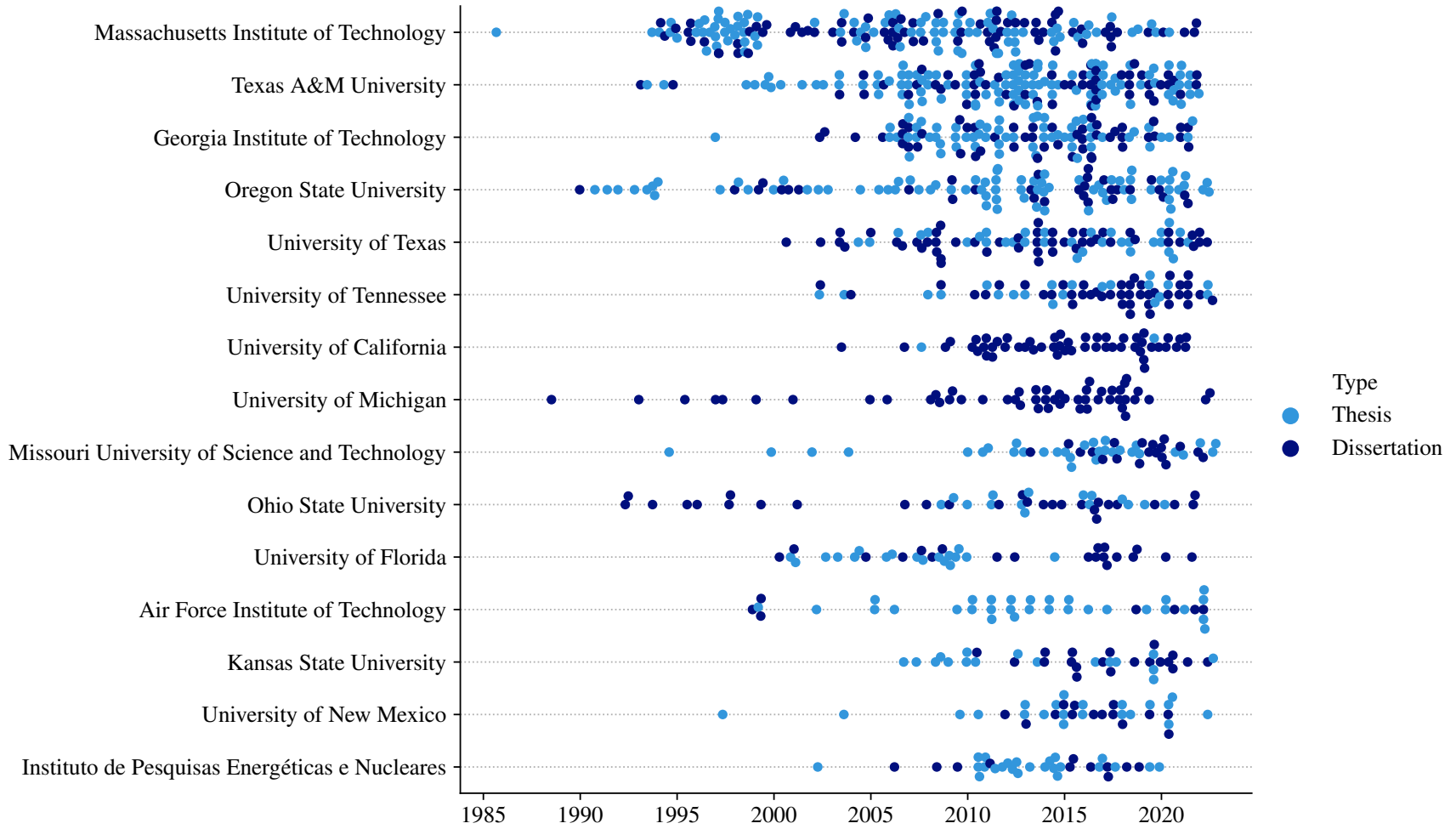


Figure 3: Publication Frequency for Top Universities by Output

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