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Author(s): Springer, Everett P.

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With Whom Does LANL Publish? – A look at LANL collaborations from 1990-2015 using the Web of Science

Everett Springer – SRO-CP

Abstract

Collaborations are critical to the science, technology, and engineering achievements at Los Alamos National Laboratory (LANL). This report analyzed the collaborations as measured through peer-reviewed publications from the Web of Science (WoS) database for LANL for the 1990 – 2015 period. Both a cumulative analysis over the entire time period and annual analyses were performed. The results found that the Department of Energy national laboratories, University of California campuses, and other academic institutions collaborate with LANL on regular basis. Results provide insights into trends in peer-reviewed papers collaborations for LANL.

Introduction

Collaborations represent a key academic measure of science performance, integration with the wider scientific community, and impact. Los Alamos National Laboratory (LANL) considers collaboration important for integrating needed capabilities into projects and as a recruiting tool through introducing scientists and students to the Laboratory. This analysis examines the collaborators on peer-reviewed publications generated by LANL from 1990 – 2015 using data from the Web of Science (WoS) Core Collection database. These results provide insight into the diversity of LANL collaborations, but do not include all of the collaborations with LANL. The Science Resource Office Communications and Peer Review Office (SRO-CP) has analyzed the Los Alamos Authors (LA Authors) database for the years 2013 – 2015, which provide another set of collaborations through presentations and reports that are not captured in the WoS data. These data will be presented in a separate report.

Methods

All data were collected from the WoS using Los Alamos National Laboratory as the “Organization-Enhanced” search term and for each year over the 1990 - 2015 period. The organization-enhanced is a WoS search feature that uses preferred organization names and name variants to ensure a more complete search for a given organization. A separate search was done using the entire 1990 – 2015 period to provide cumulative results. The publications were refined to peer-reviewed by selecting Article, Note, and Review under the WoS “Document Types” category. The Note category disappears after 2000. Using the analysis tab under the “Organization” category in the WoS window, all organizations and organizations-enhanced were downloaded for each year.

The analysis includes the organization-enhanced data for a single institution, which presents issues when an organization is tied to another. For example, Argonne National Laboratory (ANL) is part of the Organization-Enhanced University of Chicago query term, so ANL publications are included in the University of Chicago for a certain part of the 1990 – 2015 query period, but not all University of Chicago publications are included ANL. The same holds true for Lawrence Berkeley National Laboratory (LBNL), which is part of the University of California Berkeley (UCB) organization-enhanced entry again over certain period within the query time frame. In addition, staff at LBNL (ANL) may have joint appointments with the UCB (University of Chicago), which further complicates the sorting. The duplication for both ANL and LBNL and their associated universities were kept for this analysis because separating the organizations would have added considerable effort to the study without much perceived benefit.

Results

Cumulative

For the cumulative analysis of the 1990 – 2015 period, the total number of peer-reviewed publications was 40049. The number of collaborating organizations-enhanced from these publications was 6339. There are multiple factors that influence the number of collaborations. The 6339 number is misleading because it includes organizations such as the University of California system (UC) or U. S. Department of Energy (DOE), which in DOE's case includes all of the national laboratories and for the UC System all of the UC campuses. Another factor affecting the number of collaborations is the development of large team publications such as those associated with CERN (e.g., ATLAS, CMS) that have a large number of institutions involved (on the order of hundreds), which imply a large number of collaborations through the co-author network of the papers generated by these collaborations. It is not clear how credit is distributed in these collaborations. Still, in an analysis such as this, the institutions are present on the paper regardless of the author contribution leading to a large list of collaborators. Given the number of organizations found in this search, this analysis will focus on the top 25 for the cumulative and each year to provide a reference for the LANL collaborations.

The top 25 collaborating organizations and the total number of co-authored publications for the organizations for the 1990 – 2015 period are listed in Table 1. The list includes very strong mixture of academic institutions and national laboratories. There are no foreign organizations in this list. It must be clear the number of publications is not unique, i.e. several of these organizations may be on the same publication. The organizations listed are from different geographical regions of the U.S. indicating LANL's broad reach. The trend for LANL includes collaborations with mostly Western U.S. universities and laboratories due to the regional proximity to LANL. However, LANL does collaborate frequently with institutions in the Eastern U.S. (e.g., John Hopkins, Harvard, MIT, Princeton, Goddard, and Brookhaven) and Midwest institutions (University of Chicago, University of Illinois, and ANL). Some of the collaborative links are intuitive such as Livermore and Sandia since both are National Nuclear Security Administration (NNSA) laboratories; and, the High Magnetic Field Laboratory

connection with Florida State University. The quality of the institutions in Table 1 as measured by the 2016 ranking by the Center for World University Rankings (CWUR) reflects well on the quality of science at LANL.

Table 1. The top 25 collaborating institutions with LANL using peer-reviewed papers from the Web of Science Core Collection for the 1990 – 2015 period.

Organization	Publications¹	CWUR² Ranking
Lawrence Livermore National Laboratory	1421	
Oak Ridge National Laboratory	1344	
University of Chicago	1282	8
University of California Berkeley	1260	7
University of New Mexico	1209	196
University of California San Diego	1002	17
Massachusetts Institute of Technology	996	3
Lawrence Berkeley National Laboratory	838	
California Institute of Technology	834	11
Argonne National Laboratory	818	
University of California Los Angeles	816	15
University of California Davis	766	49
Sandia National Laboratory	752	
University of Michigan	740	19
Princeton University	719	9
Johns Hopkins University	694	16
Goddard Space Flight Center	685	
Florida State University	678	256
University of Colorado Boulder	671	65
Brookhaven National Laboratory	656	
University of Illinois Urbana Champaign	626	34
University of Maryland College Park	613	68
University of Washington Seattle	607	27
Harvard University	578	1
Texas A M University College Station	549	98

¹ The number publications is not unique (due to the Organization-Enhanced categorization)

² CWUR is the Center for World University Rankings, rank the world's top 1000 universities.

<http://cwur.org/>

Annual data and trends

The total number of collaborative LANL WoS peer-reviewed papers and organizations-enhanced per year for the 1990 – 2015 period are presented in Figure 1. Again, as noted in the previous section, the organizations in Figure 1 are organizations-enhanced so it includes DOE and UC System along with other national and international organizations-enhanced. Both variables in Figure 1 have an increasing trend over the period with the number of publications exhibiting more fluctuation particularly in the post 2005 period. A number of factors influenced the observed upward trend during this time

period including increased funding, staff capabilities, and the upsurge in Internet use, all facilitating collaboration.

The top 25 collaborating organizations ranked by peer-reviewed publications are listed for each year in the appendix (Tables A1 – A26). For some of the years (e.g., Table A4), there are more than 25 entries because the number of publications was the same for the final entries so the list was extended to cover these organizations. The only organization that is ranked in the top 25 for all years is the University of California San Diego (UCSD).

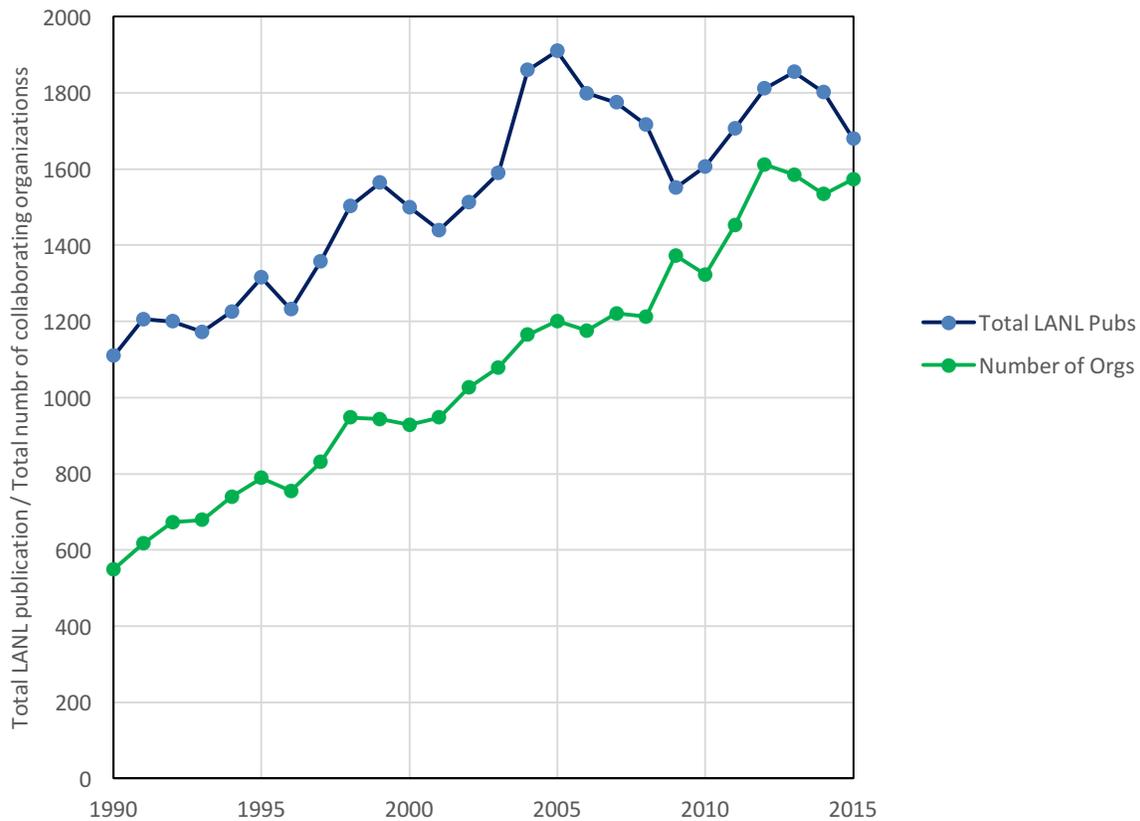


Figure 1. Comparison of the total number of LANL publications to the number of number of collaborating organizations by year.

In examining the entries in Tables A1- A26 (Appendix A), it is difficult to present the results in any meaningful way. Therefore, the entries in Table 1 will be used as the basis for further analysis. Figures 2-4 present the results for select institutions from Table 1 categorized as DOE national laboratories, University of California campuses, and other academic institutions. There are breaks in the lines indicating periods when the organization was not ranked in the top 25 with respect to number of collaborating publications.

For the DOE national laboratories in Figure 2, Lawrence Livermore National Laboratory (LLNL) and Oak Ridge National Laboratory (ORNL) are the top two in terms rank over the time period. After 1999, LLNL stays in the top five. The same is true for ORNL after 2004. In the period beginning in 2005, LBNL is also ranked very high, but with more fluctuation than LLNL or ORNL. The other NNSA laboratory, Sandia National Laboratories (SNL) has more breaks than LLNL and lower rankings overall.

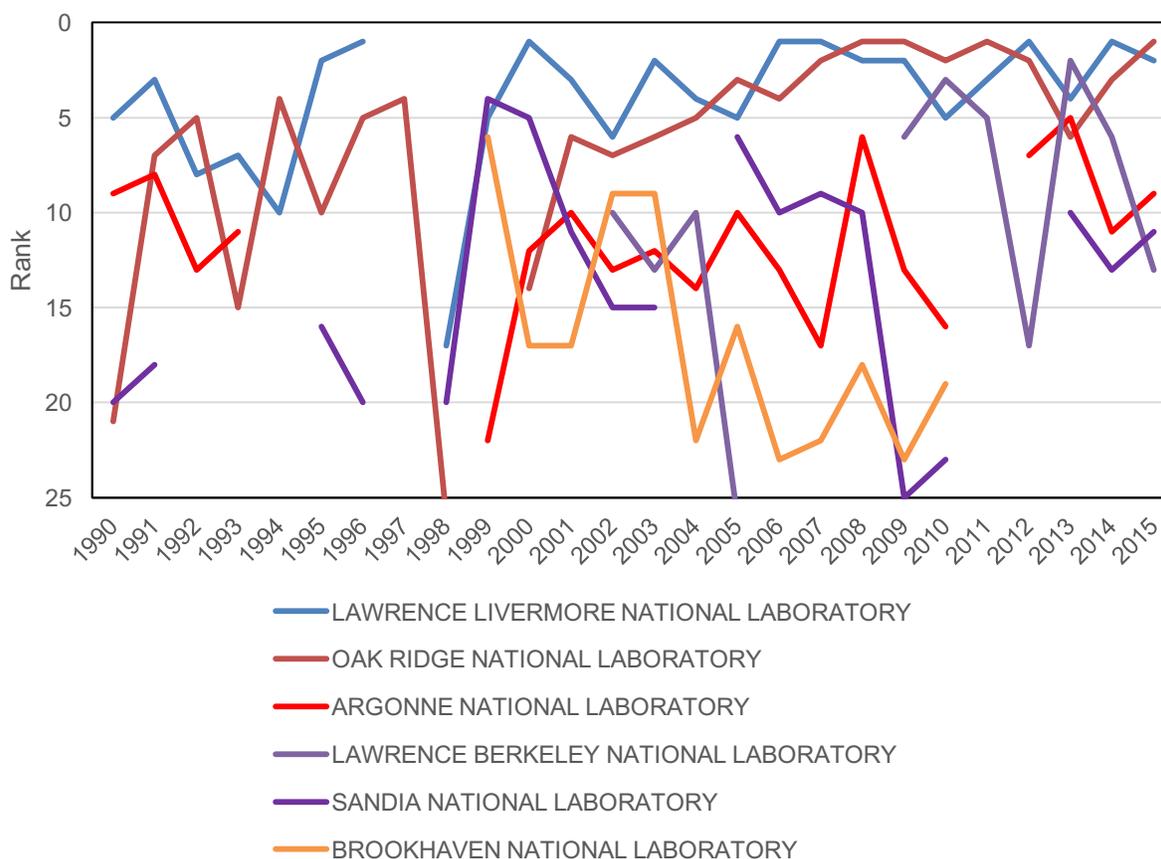


Figure 2. The rank based on number of collaborating peer-reviewed publications with LANL for the DOE national laboratories from Table 1 ranked in the top 25 for time period 1990-2015. Breaks indicate the organization was not ranked in the top 25 for that year.

The UC campuses category is presented in Figure 3. Both UCSD and University of California Los Angeles (UCLA) are ranked number 1 three of the five years between 1990-1995. Following this period, there is a downward trend for both UCLA and UCSD. At 2000, UCB is in the top five ranking for all of the period except 2006-2008. During the period 2009–2011 both UCB and University of California Davis (UCD) were ranked in the top five. This period coincided with the completion of the human genome project that boosted the number of publications for both organizations. The rapid drop by UCD after

2011 supports the impact of the genome project on publications. Still, UCB maintained its high rank after 2011.

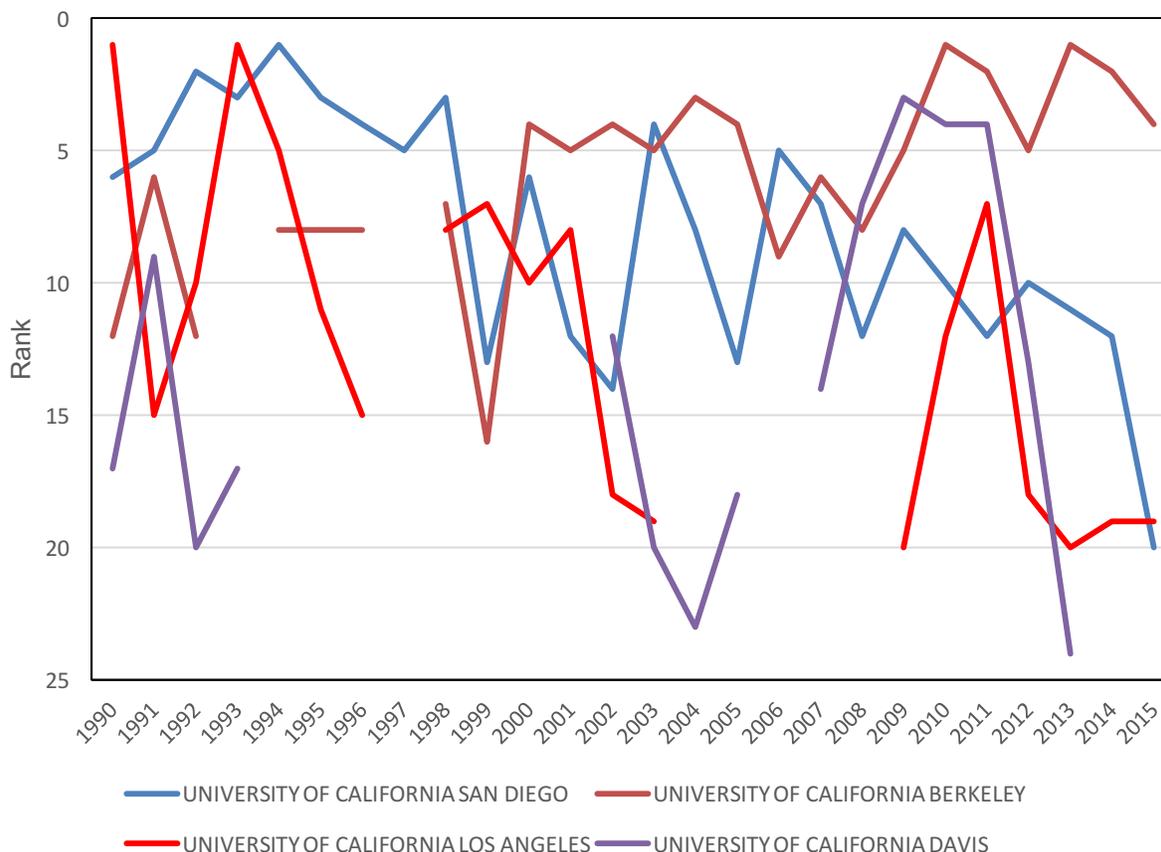


Figure 3. The rank based on number of collaborating peer-reviewed publications with LANL for University of California campuses from Table 1 ranked in the top 25 for time period 1990-2015. Breaks indicate the organization was not ranked in the top 25 for that year.

Analysis for the other academic institutions category included in Table 1 are in Figure 4. In a pattern similar to Figure 3, the organizations have relatively high rankings in the 1990's, but downward trend is observed for most institutions except the University of New Mexico (UNM) and University of Chicago, which included ANL's contributions. The drop in rankings of California Institute of Technology and John Hopkins University are indicative of the trend observed with the UC campuses in Figure 3. The cause of the shift cannot be determined without further analysis of the publications. The Massachusetts Institute of Technology (MIT) and University of Michigan do return to the top publishing universities list in the later years with MIT reappearing in 2008 (after disappearing in 2006) and the University of Michigan in 2013 (after disappearing after 2002). An interesting comparison is the relatively high ranking for UNM (Figure 3) versus the more oscillating and lower ranking for SNL (Figure 2). If geographic proximity

were a critical factor, then it would be expected that SNL would rank higher than it does in Figure 2. UNM does maintain a relative stable and high ranking throughout the 1990–2015 period.

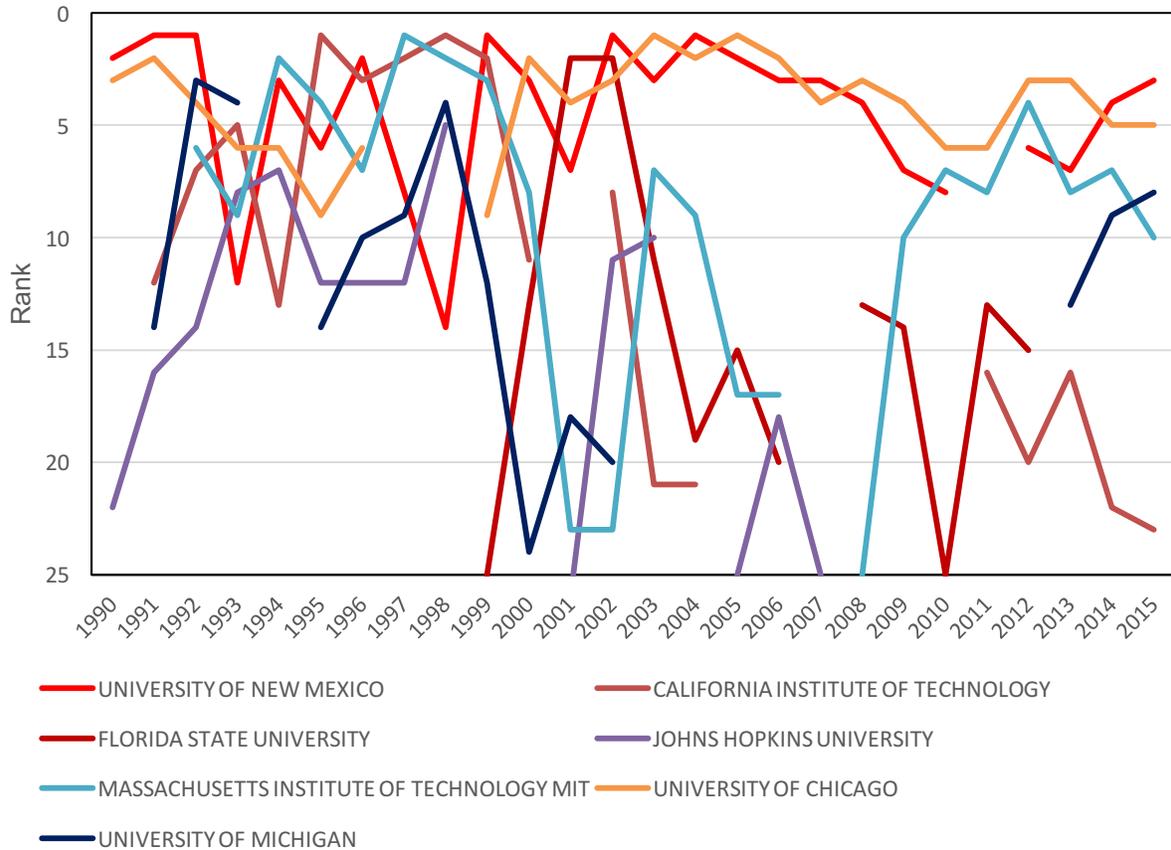


Figure 4. The rank based on number of collaborating peer-reviewed publications with LANL for other academic institutions from Table 1 ranked in the top 25 for time period 1990-2015. Breaks indicate the organization was not ranked in the top 25 for that year

Summary

This report used peer-reviewed publication data from the WoS for the 1990–2015 time period to examine the organizations with which LANL collaborated. The overall trend increased for both the number of publications and total number of collaborating organizations, with publication numbers fluctuating more on an annual basis. A cumulative analysis over the period identified the top 25 organizations that published with LANL for the period. The list included DOE national laboratories and academic institutions. The institutions in the top 25 list were examined over the same time period. Two DOE national laboratories, LLNL and ORNL, were the top of the collaborating publications list. The UC campuses displayed a declining trend except UCB. UNM and University of Chicago maintained a high ranking throughout the period.

This analysis provides a temporal view of LANL collaborations through peer-reviewed publications. A second approach that would provide an interesting comparison would be to use the LA Authors database and examine LANL collaborations in other venues such as presentations and reports to provide another perspective on collaborations. The LA Authors database is not available for this long of a period, but the comparison for available years would be interesting on the nature of LANL collaborations.

Acknowledgement

This report benefitted greatly from a technical review by Catherine Christoffersen.

Appendix A

The tables listing the annual rankings and number of peer-reviewed publications are provided in this appendix.

Table A1. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1990.

Organization	Publications
University of California Los Angeles	48
University of New Mexico	36
University of Chicago	29
University of Texas Austin	27
Lawrence Livermore National Laboratory	24
University of California San Diego	23
Massachusetts Institute of Technology	23
University of Maryland College Park	21
Argonne National Laboratory	21
University of Colorado Boulder	20
Brookhaven National Laboratory	19
University of California Berkeley	18
Ohio State University	18
Arizona State University	18
Tel Aviv University	17
University of Minnesota Twin Cities	14
University of California Davis	14
Princeton University	14
AT&T	13
Sandia National Laboratory	12
Oak Ridge National Laboratory	12
Johns Hopkins University	12
Indiana University	12
University of Florida	11
University of Arizona	11

Table A2. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1991.

Organization	Publications
University of New Mexico	31
University of Chicago	28
Lawrence Livermore National Laboratory	26

University of Texas Austin	24
University of California San Diego	23
University of California Berkeley	22
Oak Ridge National Laboratory	22
Argonne National Laboratory	20
University of California Davis	18
University of Colorado Boulder	17
University of California Santa Barbara	17
California Institute of Technology	17
Arizona State University	17
University of Michigan	16
University of California Los Angeles	16
Johns Hopkins University	16
Stanford University	15
Sandia National Laboratory	15
University of Maryland College Park	14
University of California Irvine	14
Purdue University	14
AT&T	14
Rutgers State University	13
University of British Columbia	12
Swiss Federal Institute of Technology Zurich	12

Table A3. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1992.

Organization	Publications
University of New Mexico	39
University of California San Diego	39
University of Michigan	33
University of Chicago	33
Oak Ridge National Laboratory	33
Massachusetts Institute of Technology	33
California Institute of Technology	32
Lawrence Livermore National Laboratory	31
Princeton University	29
University of California Los Angeles	26
Purdue University	26
University of California Berkeley	25
Argonne National Laboratory	25
Johns Hopkins University	24
Harvard University	24

Swiss Federal Institute of Technology Zurich	23
University of Texas Austin	22
Carnegie Mellon University	21
University of Perugia	19
University of California Davis	19
Sapienza University Rome	19
Brookhaven National Laboratory	19
University of Geneva	18
University of Florence	18
Tata Institute of Fundamental Research	18

Table A4. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1993.

Organization	Publications
University of California Los Angeles	38
Princeton University	32
University of California San Diego	30
University of Michigan	28
California Institute of Technology	28
University of Chicago	27
Lawrence Livermore National Laboratory	27
Johns Hopkins University	26
Massachusetts Institute of Technology	24
University of Texas Austin	23
Argonne National Laboratory	23
University of New Mexico	22
Swiss Federal Institute of Technology Zurich	22
Paul Scherrer Institute	22
Oak Ridge National Laboratory	21
University of Perugia	20
University of California Davis	20
Harvard University	20
Boston University	20
Texas A M University College Station	18
Purdue University	18
University of Pennsylvania	17
University of Colorado Boulder	17
Rwth Aachen University	17
Rutgers State University	17
Ohio State University	17

Table A5. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1994.

Organization	Publications
University of California San Diego	38
Massachusetts Institute of Technology	32
University of New Mexico	29
Oak Ridge National Laboratory	27
University of California Los Angeles	26
University of Chicago	24
Johns Hopkins University	23
University of California Berkeley	22
New Mexico State University	22
Lawrence Livermore National Laboratory	21
Swiss Federal Institute of Technology Zurich	20
Stanford University	20
California Institute of Technology	20
Boston University	20
University of Amsterdam	19
Ohio State University	19
University of California Irvine	18
Princeton University	18
Iowa State University	18
Imperial College London	18
University of Maryland College Park	16
Goddard Space Flight Center	16
Purdue University	15
Indiana University	15
Harvard University	15
Ames National Laboratory	15

Table A6. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1995.

Organization	Publications
California Institute of Technology	44
Lawrence Livermore National Laboratory	42
University of California San Diego	38
Massachusetts Institute of Technology	37
Imperial College London	37
University of New Mexico	34
Princeton University	34
University of California Berkeley	30

University of Chicago	29
Oak Ridge National Laboratory	27
University of California Los Angeles	26
Johns Hopkins University	26
Jet Propulsion Laboratory	26
University of Michigan	23
University of California Davis	22
Sandia National Laboratory	22
Lawrence Berkeley National Laboratory	21
Harvard University	21
Carnegie Mellon University	18
Brookhaven National Laboratory	18
Boston University	18
Argonne National Laboratory	18
University of Perugia	17
Swiss Federal Institute of Technology Zurich	17
Sapienza University Rome	17
Ohio State University	17

Table A7. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1996.

Organization	Publications
Lawrence Livermore National Laboratory	41
University of New Mexico	39
California Institute of Technology	38
University of California San Diego	33
Oak Ridge National Laboratory	33
University of Chicago	29
Massachusetts Institute of Technology	28
University of California Berkeley	27
Princeton University	27
University of Michigan	26
University of Amsterdam	26
Johns Hopkins University	25
Jet Propulsion Laboratory	25
Imperial College London	25
University of California Los Angeles	24
Boston University	23
Texas A M University College Station	21
Paul Scherrer Institute	21
Swiss Federal Institute of Technology Zurich	19

Sandia National Laboratory	19
Florida State University	19
University of Hamburg	18
University of Texas Austin	17
University of Basel	17
Tata Institute of Fundamental Research	17

Table A8. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1997.

Organization	Publications
Massachusetts Institute of Technology	44
California Institute of Technology	44
Princeton University	42
Oak Ridge National Laboratory	42
University of California San Diego	41
Swiss Federal Institute of Technology Zurich	40
Boston University	40
University of New Mexico	38
University of Michigan	37
University of Amsterdam	37
Harvard University	37
Johns Hopkins University	33
Carnegie Mellon University	32
Paul Scherrer Institute	31
University of Basel	29
University of Utrecht	28
University of Florence	28
University of Alabama Tuscaloosa	28
Sapienza University Rome	28
Rwth Aachen University	28
Purdue University	28
University of Lausanne	27
Univ Naples	27
Tata Institute of Fundamental Research	27
University of Savoie	26
University of Salerno	26
University of Salento	26
University of Perugia	26
University of Hamburg	26
University of Geneva	26
University of Cyprus	26

University of Bucharest	26
Radboud University Nijmegen	26
Northeastern University	26

Table A9. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1998.

Organization	Publications
California Institute of Technology	59
Massachusetts Institute of Technology	53
University of California San Diego	46
University of Michigan	45
Johns Hopkins University	44
Boston University	42
University of California Berkeley	41
University of California Los Angeles	40
Goddard Space Flight Center	39
Princeton University	38
Carnegie Mellon University	38
University of Amsterdam	37
Purdue University	34
University of New Mexico	33
Paul Scherrer Institute	33
Swiss Federal Institute of Technology Zurich	32
Lawrence Livermore National Laboratory	32
University of Basel	31
University of Utrecht	30
Sandia National Laboratory	30
Alikhanov Institute for Theoretical Experimental Physics	30
University of Science Technology China	29
University of Illinois Urbana Champaign	29
University of Geneva	29
University of Bologna	29
Oak Ridge National Laboratory	29

Table A10. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 1999.

Organization	Publications
University of New Mexico	45
California Institute of Technology	42
Massachusetts Institute of Technology	37

Sandia National Laboratory	36
Lawrence Livermore National Laboratory	35
Brookhaven National Laboratory	35
University of California Los Angeles	34
University of Washington Seattle	30
University of Chicago	30
Louisiana State University	30
Goddard Space Flight Center	30
University of Michigan	29
University of California San Diego	29
Princeton University	27
Carnegie Mellon University	26
University of California Berkeley	25
Penn State University	25
State University of New York SUNY Stony Brook	24
University of Wisconsin Madison	23
University of Maryland College Park	23
University of California Irvine	23
Argonne National Laboratory	23
University of Illinois Urbana Champaign	22
Stanford University	22
Florida State University	22
Boston University	22

Table A11. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2000.

Organization	Publications
Lawrence Livermore National Laboratory	41
University of Chicago	39
University of New Mexico	38
University of California Berkeley	36
Sandia National Laboratory	33
University of California San Diego	31
University of Illinois Urbana Champaign	29
Massachusetts Institute of Technology	28
Goddard Space Flight Center	28
University of California Los Angeles	27
California Institute of Technology	27
Argonne National Laboratory	27
Florida State University	26
Oak Ridge National Laboratory	25

University of Washington Seattle	24
Penn State University	21
Brookhaven National Laboratory	21
University of California Riverside	20
Princeton University	20
Lawrence Berkeley National Laboratory	20
University of Tokyo	18
University of North Carolina Chapel Hill	18
Gubkin Russian State University of Oil Gas	18
University of Michigan	17
University of California Santa Barbara	17
Columbia University	17

Table A12. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2001.

Organization	Publications
Goddard Space Flight Center	41
Florida State University	40
Lawrence Livermore National Laboratory	39
University of Chicago	38
University of California Berkeley	36
Oak Ridge National Laboratory	32
University of New Mexico	31
University of California Los Angeles	31
Princeton University	31
Argonne National Laboratory	31
Sandia National Laboratory	29
University of California San Diego	28
University of North Carolina Chapel Hill	26
University of Washington Seattle	24
University of London	24
Stanford University	24
Brookhaven National Laboratory	24
University of Michigan	23
Columbia University	23
University of Tokyo	22
University of Maryland College Park	22
University College London	22
Massachusetts Institute of Technology	22
University of California Santa Barbara	21
University of Illinois Urbana Champaign	20

Johns Hopkins University	20
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Table A13. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2002.

Organization	Publications
University of New Mexico	59
Florida State University	40
University of Chicago	38
University of California Berkeley	36
Princeton University	35
Lawrence Livermore National Laboratory	34
Oak Ridge National Laboratory	33
California Institute of Technology	33
Brookhaven National Laboratory	32
Lawrence Berkeley National Laboratory	29
Johns Hopkins University	26
University of California Davis	25
Argonne National Laboratory	25
University of California San Diego	24
Sandia National Laboratory	24
University of Washington Seattle	23
Columbia University	23
University of California Los Angeles	22
University of Tokyo	21
University of Michigan	21
University of Arizona	21
New Mexico State University	21
Massachusetts Institute of Technology	21
Cornell University	21
University of California Riverside	18
Penn State University	18
Kyoto University	18

Table A14. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2003.

Organization	Publications
University of Chicago	46
Lawrence Livermore National Laboratory	46
University of New Mexico	44
University of California San Diego	41

University of California Berkeley	40
Oak Ridge National Laboratory	39
Massachusetts Institute of Technology	39
Princeton University	36
Brookhaven National Laboratory	35
Johns Hopkins University	34
Florida State University	32
Argonne National Laboratory	31
Lawrence Berkeley National Laboratory	30
University of Washington Seattle	29
Sandia National Laboratory	29
New Mexico State University	29
Columbia University	29
University of Illinois Urbana Champaign	28
University of California Los Angeles	28
University of California Davis	28
California Institute of Technology	28
University of Wisconsin Madison	27
University of Tokyo	26
Kyoto University	26
University of California Riverside	24

Table A15. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2004.

Organization	Publications
University of New Mexico	63
University of Chicago	63
University of California Berkeley	60
Lawrence Livermore National Laboratory	49
Oak Ridge National Laboratory	45
University of Arizona	43
University of Washington Seattle	39
University of California San Diego	39
Massachusetts Institute of Technology	39
Lawrence Berkeley National Laboratory	37
University of Illinois Urbana Champaign	36
New Mexico State University	35
Goddard Space Flight Center	35
Argonne National Laboratory	34
University of Michigan	32
University of California Riverside	32

Seoul National University	31
Princeton University	31
Florida State University	31
Columbia University	31
California Institute of Technology	31
Brookhaven National Laboratory	31
University of California Davis	30
University of Tokyo	29
University of Maryland College Park	29

Table A16. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2005.

Organization	Publications
University of Chicago	89
University of New Mexico	64
Oak Ridge National Laboratory	60
University of California Berkeley	58
Lawrence Livermore National Laboratory	53
Sandia National Laboratory	48
University of Illinois Urbana Champaign	42
Imperial College London	41
Goddard Space Flight Center	41
Argonne National Laboratory	41
University of Tennessee Knoxville	40
University of Tokyo	39
University of California San Diego	38
State University of New York SUNY Stony Brook	37
Florida State University	36
Brookhaven National Laboratory	36
Massachusetts Institute of Technology	35
University of California Davis	34
University of Arizona	33
Seoul National University	33
New Mexico State University	33
Columbia University	33
Iowa State University	31
University of Colorado Boulder	30
Tokyo Institute of Technology	30
Lawrence Berkeley National Laboratory	30
Johns Hopkins University	30

Table A17. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2006.

Organization	Publications
Lawrence Livermore National Laboratory	70
University of Chicago	69
University of New Mexico	57
Oak Ridge National Laboratory	51
University of California San Diego	49
Goddard Space Flight Center	49
Penn State University	48
University of Tokyo	43
University of California Berkeley	42
Sandia National Laboratory	38
University of Tennessee Knoxville	37
Seoul National University	37
Argonne National Laboratory	35
University of Washington Seattle	33
University of Michigan	33
University of Arizona	33
Massachusetts Institute of Technology	33
Johns Hopkins University	32
University of Illinois Urbana Champaign	30
Florida State University	29
Columbia University	29
University of California Riverside	28
Brookhaven National Laboratory	28
University of California Los Angeles	26
Iowa State University	26
Imperial College London	26

Table A18. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2007.

Organization	Publications
Lawrence Livermore National Laboratory	82
Oak Ridge National Laboratory	63
University of New Mexico	52
University of Chicago	48
Texas A M University College Station	44
University of California Berkeley	43
University of California San Diego	42
Columbia University	38

Sandia National Laboratory	37
Imperial College London	37
University of Tokyo	36
Iowa State University	34
University of Tennessee Knoxville	33
University of California Davis	33
University of Arizona	33
Goddard Space Flight Center	33
Argonne National Laboratory	33
University of Illinois Urbana Champaign	32
Seoul National University	32
Penn State University	32
Lawrence Berkeley National Laboratory	32
Brookhaven National Laboratory	32
University of Washington Seattle	31
Tokyo Institute of Technology	31
Johns Hopkins University	31

Table A19. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2008.

Organization	Publications
Oak Ridge National Laboratory	71
Lawrence Livermore National Laboratory	66
University of Chicago	59
University of New Mexico	55
Imperial College London	40
Argonne National Laboratory	39
University of California Davis	37
University of California Berkeley	36
University of Tennessee Knoxville	35
Sandia National Laboratory	35
University of Illinois Urbana Champaign	34
University of California San Diego	34
Florida State University	32
University of Tokyo	31
University of Oxford	31
University of Colorado Boulder	31
Columbia University	31
Brookhaven National Laboratory	31
University of Washington Seattle	30
University of California Irvine	30

Arizona State University	30
University of Cambridge	29
Penn State University	29
Texas A M University College Station	28
Massachusetts Institute of Technology	28
Iowa State University	28

Table A20. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2009.

Organization	Publications
Oak Ridge National Laboratory	80
Lawrence Livermore National Laboratory	77
University of California Davis	63
University of Chicago	61
University of California Berkeley	59
Lawrence Berkeley National Laboratory	49
University of New Mexico	46
University of California San Diego	44
Texas A M University College Station	36
Massachusetts Institute of Technology	36
Columbia University	36
University of Colorado Boulder	34
Argonne National Laboratory	34
Florida State University	33
University of Washington Seattle	32
Arizona State University	31
North Carolina State University	30
Imperial College London	30
University of Tokyo	29
University of California Los Angeles	29
Duke University	29
University of Arizona	28
Brookhaven National Laboratory	28
Tokyo Institute of Technology	27
Sandia National Laboratory	27
Goddard Space Flight Center	27

Table A21. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2010.

Organization	Publications
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University of California Berkeley	120
Oak Ridge National Laboratory	109
Lawrence Berkeley National Laboratory	92
University of California Davis	77
Lawrence Livermore National Laboratory	67
University of Chicago	52
Massachusetts Institute of Technology	47
University of New Mexico	45
University of Colorado Boulder	45
University of California San Diego	41
University of Washington Seattle	35
University of California Los Angeles	32
University of Arizona	31
New Mexico State University	31
Columbia University	31
Argonne National Laboratory	31
University of Michigan	30
University of Maryland College Park	30
Brookhaven National Laboratory	30
University of Tennessee Knoxville	29
University of Tokyo	28
University of California Santa Cruz	28
Sandia National Laboratory	28
Goddard Space Flight Center	28
Florida State University	27

Table A22. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2011.

Organization	Publications
Oak Ridge National Laboratory	152
University of California Berkeley	114
Lawrence Livermore National Laboratory	107
University of California Davis	95
Lawrence Berkeley National Laboratory	89
University of Chicago	88
University of California Los Angeles	78
Massachusetts Institute of Technology	77
University of Tennessee Knoxville	69
University of Maryland College Park	69
University of Colorado Boulder	68
University of California San Diego	68

Florida State University	67
Charles University Prague	65
Joint Inst Nucl Res	64
California Institute of Technology	64
Texas A M University College Station	63
University of California Santa Barbara	57
University of Virginia	56
University of Notre Dame	56
Bhabha Atomic Research Center	56
University of Wisconsin Madison	55
University of Rochester	55
Purdue University	55
Ohio State University	55
Ecole Polytechnique	55

Table A23. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2012.

Organization	Publications
Lawrence Livermore National Laboratory	117
Oak Ridge National Laboratory	104
University of Chicago	96
Massachusetts Institute of Technology	91
University of California Berkeley	77
University of New Mexico	72
Argonne National Laboratory	72
University of Maryland College Park	71
University of Wisconsin Madison	69
University of California San Diego	69
Ohio State University	68
University of Colorado Boulder	67
University of California Davis	67
University of Tennessee Knoxville	64
Florida State University	62
University of Rochester	61
Lawrence Berkeley National Laboratory	60
University of California Los Angeles	58
Charles University Prague	58
California Institute of Technology	56
Johns Hopkins University	55
University of Florida	54
Texas A M University College Station	54

University of California Riverside	49
Princeton University	49
Ecole Polytechnique	49
Carnegie Mellon University	49

Table A24. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2013.

Organization	Publications
University of California Berkeley	104
Lawrence Berkeley National Laboratory	90
University of Chicago	87
Lawrence Livermore National Laboratory	81
Argonne National Laboratory	67
Oak Ridge National Laboratory	62
University of New Mexico	59
Massachusetts Institute of Technology	53
University of Colorado Boulder	48
Sandia National Laboratory	48
University of California San Diego	47
Goddard Space Flight Center	47
University of Michigan	44
Penn State University	44
University of Maryland College Park	43
California Institute of Technology	40
University of Washington Seattle	37
University of Wisconsin Madison	36
University of New Hampshire	35
University of California Los Angeles	35
University of California Irvine	34
Columbia University	34
University of Illinois Urbana Champaign	33
University of California Davis	32
University of Tennessee Knoxville	31
State University of New York SUNY Stony Brook	31
Pacific Northwest Laboratory	31

Table A25. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2014.

Organization	Publications
Lawrence Livermore National Laboratory	109

University of California Berkeley	87
Oak Ridge National Laboratory	83
University of New Mexico	81
University of Chicago	75
Lawrence Berkeley National Laboratory	59
Massachusetts Institute of Technology	58
University of Colorado Boulder	54
University of Michigan	52
University of New Hampshire	51
Argonne National Laboratory	50
University of California San Diego	49
Sandia National Laboratory	46
Pacific Northwest National Laboratory	43
University of Wisconsin Madison	40
University of Tennessee Knoxville	40
Brookhaven National Laboratory	40
University of Illinois Urbana Champaign	39
University of California Los Angeles	39
Goddard Space Flight Center	38
University of Washington Seattle	37
California Institute of Technology	37
University of Minnesota Twin Cities	36
Duke University	35
University of Iowa	32

Table A26. Top 25 collaborating institutions based on co-authored peer-reviewed papers with Los Alamos National Laboratory in 2015.

Organization	Publications
Oak Ridge National Laboratory	80
Lawrence Livermore National Laboratory	79
University of New Mexico	74
University of California Berkeley	71
University of Chicago	67
University of New Hampshire	60
University of Colorado Boulder	59
University of Michigan	49
Argonne National Laboratory	48
Massachusetts Institute of Technology	46
Sandia National Laboratory	45
Goddard Space Flight Center	45
Lawrence Berkeley National Laboratory	40

Johns Hopkins University	38
University of Tennessee Knoxville	37
University of Maryland College Park	37
University of Massachusetts Amherst	36
University of Illinois Urbana Champaign	36
University of California Los Angeles	36
University of California San Diego	34
University of Iowa	33
Penn State University	33
California Institute of Technology	33
Florida State University	32
University of Minnesota Twin Cities	31
Harvard University	31