

# Assessing the Impact of the National Institute of Standards and Technology's Research Collaborations

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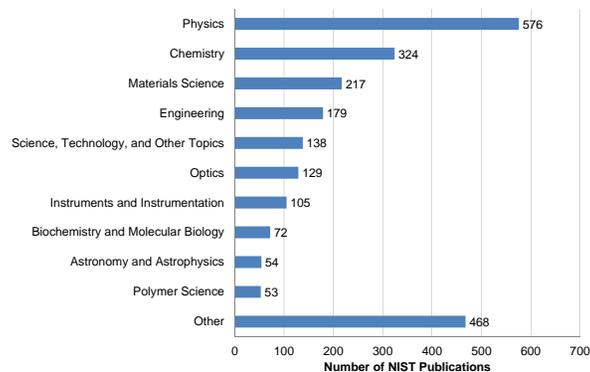
## Introduction

The Information Services Office (ISO) of the National Institute of Standards and Technology (NIST) conducted a study to assess the impact of NIST researcher collaborations by looking at the NIST papers co-authored with other researchers external to NIST. This request from NIST senior management focused on the number of unique non-NIST co-authors on NIST authored papers and the number of unique institutions which NIST collaborates with on publications for the past five years.

The information collected was under consideration as a metric for the yearly, statutorily-required, U.S. Department of Commerce Technology Transfer Report. The results of the study also support NIST's activities to meet the requirements of the October 28, 2011 Presidential Memorandum Accelerating Technology Transfer and Commercialization of Federal Research in Support of High-Growth Businesses. The findings reveal that NIST research collaborations have increased by 26% based on the increase in the number of unique co-authors which ranged from 3,289 in 2008 to 4,141 in 2012.

## Overview of NIST Research Publications

The analysis, based on a *Web of Science (WoS)* search, yielded 1,336 NIST journal articles in 420 different journals and 96 different *WoS* Subject Categories for 2012. Approximately 43% of the papers were in the field of physics. In the chart below, "other" represents the 86 *WoS* categories that had fewer than 30 articles. Publication numbers in the chart total more than 1,336 because a paper/journal can fall into multiple categories.



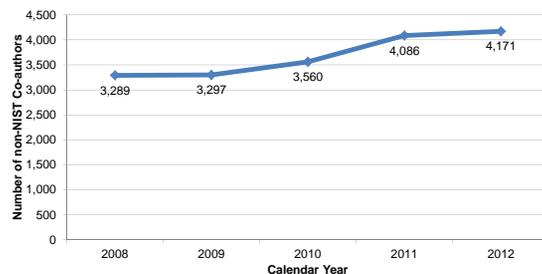
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## Methodology

Unique co-authors and institutions were identified by performing a search for all NIST authored papers in the *Web of Science (WoS)* database for the years 2008-2012. ISO used a complex *WoS* search strategy that included many address variations for NIST including its former name, the National Bureau of Standards. The search included publications in the peer-reviewed literature (journals) while excluding most conference proceedings papers and all NIST technical series publications or reports.

## Findings and Results

NIST researchers collaborated with 4,141 non-NIST authors in 2012. There was a steady increase from 2008 (3,289 researchers) to 2012 (4,141 researchers), a 26% increase over the five year period.



NIST researchers collaborated with researchers from 963 institutions throughout the world in 2012. These institutions include universities and colleges, other Federal research labs, other Federal agencies, National Metrology Institutes (NMIs), research institutes in other countries, companies, hospitals, zoos, and high schools.



## Findings and Results, Continued

The University of Maryland is the organization NIST collaborated with most frequently on papers published from 2008-2012. The University of Colorado is second, co-authoring 652 papers with NIST during the same period. These results are not surprising since NIST has joint ventures with the University of Maryland (Joint Quantum Institute) and the University of Colorado at Boulder (JILA). The top ten collaborating institutions include seven U.S. academic institutions and three Federal research laboratories.

Institution Name	Number of Papers
University of Maryland	1,029
University of Colorado	652
Oak Ridge National Laboratory	200
University of California, Berkeley	139
Los Alamos National Laboratory	136
Argonne National Laboratory	115
Indiana University	110
University of Michigan	97
Johns Hopkins University	96
Massachusetts Institute of Technology	96

## Conclusions and Recommendations

This study revealed that the breadth and reach of NIST's peer-reviewed publications is impressive as it represents collaborative efforts with thousands of authors from over 1,000 institutions in over 100 countries during the 5-year period from 2008-2012. Institution types range from universities and government agencies to hospitals, zoos, and high schools. The study demonstrated that the impact of NIST's publications is broad and far-reaching.

While this study analyzed collaboration metrics specific to the number of non-NIST co-authors, and the number of institutions and countries with which NIST collaborates, many other related metrics can be studied. Suggestions for further study recommended to NIST senior management include the percentage breakdown of publication collaborations by type of institution (i.e., universities and colleges, Federal research laboratories, Federal agencies, NMIs, industry, etc.). Further analysis can also be performed to determine to what extent each NIST operating unit (lab, division, etc.) collaborates with outside institutions, and to what extent NIST collaborates with researchers and institutions in each state within the U.S.