

# A Decade of SOUPS: An Analysis of Ingredients

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## ABSTRACT

The authors survey and describe the accepted submissions to the Symposium on Usable Privacy and Security (SOUPS) since its inception in 2005. We observe some noteworthy trends in both the accepted papers and in the authorship of those papers while keeping historical views of the trends in mind. We aim to identify emerging topics of interests in the usable privacy and security domain. Furthermore, this investigation would shed insights on the academic vs. practitioners' view on privacy and security especially with the proliferation of digital communication tools in the last decade that have engaged the society in profound debates on the corrosion of privacy.

## 1. INTRODUCTION

The first Symposium on Usable Privacy and Security took place in 2005 after researchers in this growing field came together at workshops in 2003 and 2004.[1] Many of the researchers had been working in the multiple, but related areas of security, privacy and human-computer interaction and as the multi-disciplinary work evolved into usable privacy and usable security, researchers realized that a dedicated conference or symposium would be well received.

SOUPS was initially sponsored by the relatively new (founded in 2003) CyLab at Carnegie Mellon University. Today, the CMU CyLab is one of the largest university-sponsored cybersecurity research laboratories in the United States [2] and continues to be a vital sponsor of the annual SOUPS.

From the beginning, the symposium consists of refereed papers along with pertinent tutorials, workshops, invited keynote speakers and posters. It has been well received in the usable privacy and security community with almost 100 registrants in 2005 [1] to a sold-out capacity of 300 in 2014.[3]

In this paper, we reflect on the decade of SOUPS, examining the symposium's evolution, topic trends (emerging and persistent), and co-authorship network.

## 2. DATA COLLECTION

The primary source of data is the SOUPS program websites and conference proceedings for the respective years. Data was downloaded from the various years' program websites. In a few cases, data cleaning was required, such as normalizing author names (e.g. 'Lorrie Faith', 'Lorrie Faith Cranor', 'Lorrie Cranor' were normalized to 'Lorrie Faith Cranor'). Information was extracted and parsed to be stored in relational data format. Authors of the papers were extracted to identify co-authorship information. Gephi (<https://gephi.github.io>) was used to visualize the co-authorship network.

## 3. ANALYSIS AND FINDINGS

While the number of papers submitted to SOUPS has fairly consistently grown (with SOUPS '11 being an exception), the

acceptance rate has stayed fairly consistent (with SOUPS '12 being an exception.) The lowest rate was in 2012 at 21% with the highest in 2006 at 36% which is a variance of 15%. However, if both 2006 and 2012 are excluded, then the range of rates is from 25% to 31%, a variance of only 6%. The cumulative or overall acceptance rate is 28% which is also the mean of all the rates. While there are conferences with more selective acceptance rates, the rate of 28% should be considered very respectable.

While the Symposium has more than doubled the number of papers submitted for 2014 over the first year in 2005; the attendance has impressively more than quadrupled from 71 to approximately 300. We believe this indicates a very successful academic symposium and solid recognition that the content is timely and worthwhile.

With a total of 145 papers accepted over the past ten years, there have been 371 distinct authors. The average number of authors on a paper was 3.8. The maximum number of authors on a paper was nine and there were a total of five papers with nine authors. There were four papers having a single author..

In the ten years of SOUPS, 91 authors have been accepted with more than one paper. The most prolific author was Lorrie Faith Cranor at Carnegie Mellon University with a total of 16 papers. The second most prolific was Konstantin Beznosov at the University of British Columbia with ten papers. There is not an author who has had a paper accepted in each of the ten years of SOUPS.

A network diagram of all the authors was built connecting the co-authors together. This network contained the 371 authors as nodes and a total of 819 edges. The graph distance or the longest path between two nodes is 8. The average path length is 3.424. Lorrie Faith Cranor has the highest degree of connectivity with a degree of 40. Two authors have a degree of 0.

There were three categories of papers in 2005. These categories were Usable Privacy, Usable Security and Visualizing Security. The conference organizers undoubtedly chose these categories to fit the three groups of accepted papers and had a similar responsibility in each year. We have re-categorized the papers as a whole from 2005 to 2014; first simply as either Usable Privacy or Usable Security and then with a more granular category.

When considering just the two categories for all papers, Usable Security papers account for 63% of the total papers while the number of Usable Privacy papers exceeded Usable Security for the first time in 2014.

The category for each paper was then determined with an attempt to have somewhat standard categories so that the consistency or growth of particular areas could be determined. There were a total of 25 categories utilized. The most consistent category is Authentication, the only category represented in each year since the inception of the Symposium. Authentication is also the largest category with 28% of the total papers. The second largest is Decision-Making with 16 papers or 11% of the total.

It is interesting to note that Social Media Privacy and Cloud Privacy both appeared for the first time in 2011 but that Cloud Privacy has not re-appeared and Social Media Privacy has been a consistent topic since its appearance. Despite its late appearance, Social Media Privacy is the third largest category with 12 papers or 8.3% of the total. Barely behind is Policy with 11 papers or 7.6% of the total.

Authentication presents classic usability issues with research attempting to build a better password system. Together, decision-making (of users, designers and researchers) and policy-making will help to build more usable and robust systems. Social Media influences many personal and business activities and it would be hard to imagine its absence. At the same time, everyone would like to ensure that privacy remains an integral part of any social media activities.

We are looking forward to see what influence the past has on SOUPS 2015.

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## Introduction

The authors survey and perform a citation and network analysis of the accepted submissions to the Symposium on Usable Privacy and Security (SOUPS) since its inception in 2005. There are a total of 145 papers for the ten years of the symposium. Including the authored papers that were cited in each of these 145, there are a total of 2,674 documents in this analysis. There are 4,251 unique authors with documents spanning from 1883 (*La Cryptographie Militaire*) to multiple documents in 2014.

There are some expected and some unexpected findings shown in the results.



Figure 1. Top 25 author keywords from network

	Papers Submitted	Papers Accepted	Acceptance Rate	Previous Year Growth Rate	Growth since beginning
SOUPS '05	39	10	26%		
SOUPS '06	39	14	36%	0%	0%
SOUPS '07	41	13	32%	5%	5%
SOUPS '08	43	12	28%	5%	10%
SOUPS '09	49	15	31%	14%	26%
SOUPS '10	64	16	25%	31%	64%
SOUPS '11	45	15	33%	-30%	15%
SOUPS '12	67	14	21%	49%	72%
SOUPS '13	51	15	29%	-24%	31%
SOUPS '14	79	21	27%	55%	103%
	517	145	28%		

Figure 2. Paper Acceptance and Growth Rates

## Quick Facts

### Most Cited Paper

Why Johnny Can't Encrypt: A Usability Evaluation of PGP 5.0 (1999) (26 Citations)

### Most Cited SOUPS Paper

The battle against phishing: Dynamic Security Skins (2010) (9 citations)

### Average Citations per SOUPS paper

26.8

### Average # Times Each Citation Used

1.5

### Most Cited First Author

Rachna Dhamija (42 Citations)

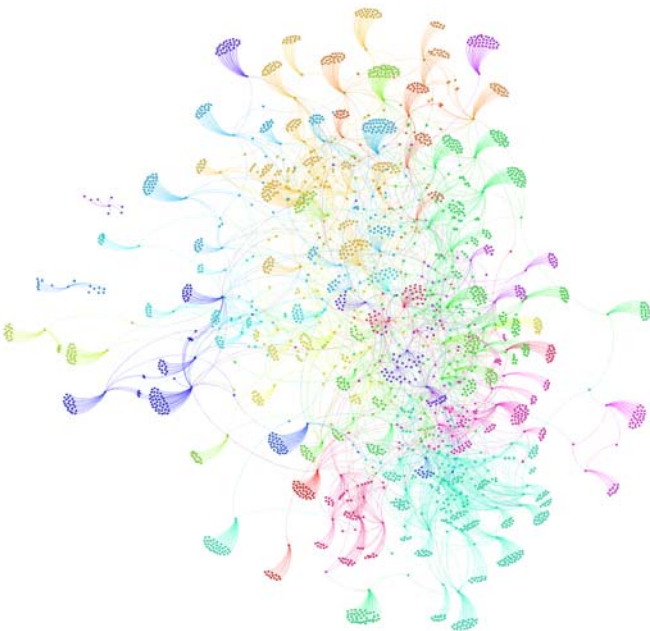


Figure 3. Network of Papers

The 145 SOUPS papers are shown, in Figure 3, connected to the papers which each cites. Communities are shown in different colors. Only two papers stand alone while most have citations in common with at least one other paper.

## Findings and Future Work

This is research in progress and, as such, only preliminary findings are available. However, network analysis with modularity classes was able to group the document network into 23 communities or classes. Preliminary subjects have been given to those classes. It is our plan to continue with the analysis to determine on-going trends, gaps, and other community findings.

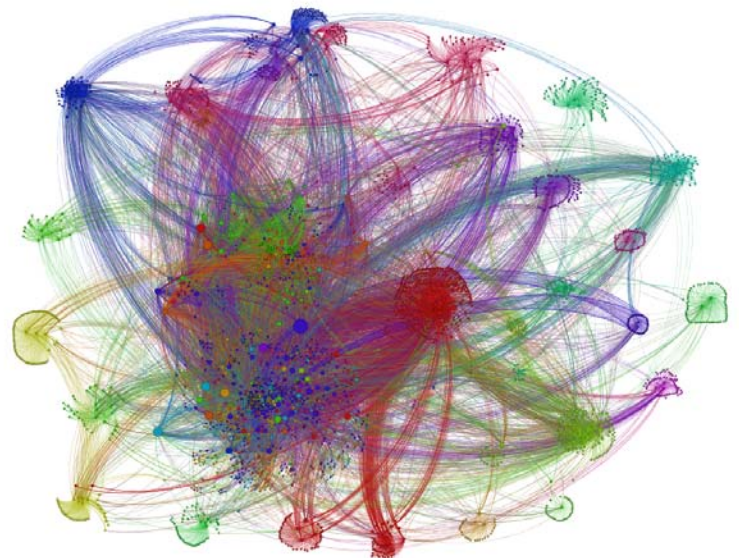


Figure 4. Network of Authors

Figure 4 illustrates the connections between authors citing other authors. Communities are shown in different colors. While some stand relatively alone, it is clear that the center of the network is very highly interconnected.