

1 Michael W. Sobol (State Bar No. 194857)
msobol@lchb.com
2 David T. Rudolph (State Bar No. 233457)
drudolph@lchb.com
3 Melissa Gardner (State Bar No. 289096)
mgardner@lchb.com
4 LIEFF CABRASER HEIMANN & BERNSTEIN, LLP
275 Battery Street, 29th Floor
5 San Francisco, CA 94111-3339
Telephone: 415.956.1000
6 Facsimile: 415.956.1008

7 Hank Bates (State Bar No. 167688)
hbates@cbplaw.com
8 Allen Carney
acarney@cbplaw.com
9 David Slade
dslade@cbplaw.com
10 CARNEY BATES & PULLIAM, PLLC
11 11311 Arcade Drive
Little Rock, AR 72212
Telephone: 501.312.8500
12 Facsimile: 501.312.8505

13 *Attorneys for Plaintiffs and the Proposed Class*

14 UNITED STATES DISTRICT COURT
15 NORTHERN DISTRICT OF CALIFORNIA
16

17 MATTHEW CAMPBELL and MICHAEL
HURLEY, on behalf of themselves and all
18 others similarly situated,

19 Plaintiffs,

20 v.

21 FACEBOOK, INC.,

22 Defendant.

Case No. C 13-05996 PJH (MEJ)

**REPORT OF DR. JENNIFER GOLBECK
IN SUPPORT OF PLAINTIFFS' MOTION
FOR CLASS CERTIFICATION**

HEARING

Date: March 16, 2016

Time: 9:00 a.m.

Place: Courtroom 3, 3rd Floor
The Honorable Phyllis J. Hamilton

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

TABLE OF CONTENTS

Page

I. QUALIFICATIONS 1

II. METHODOLOGY AND SUMMARY OF CONCLUSIONS 3

III. FACEBOOK’S INTERCEPTION OF PRIVATE MESSAGE CONTENT 5

A. Facebook’s Private Message Architecture Functionality 5

B. Facebook’s Interception and Logging of Private Message Content 9

C. Facebook’s Use Of Code-Based Devices To Intercept Private
Message Content 14

IV. FACEBOOK’S USES OF INTERCEPTED PRIVATE MESSAGE DATA 15

A. Facebook Used Private Message Content To Push Content To
Users Via Its Recommendation Algorithms And Other Features 15

B. Incrementing Like Counter 23

V. FACEBOOK’S CONDUCT CONTINUES TO THE PRESENT 26

A. Facebook Has Not Ceased Its Practice Of Intercepting, Analyzing,
and Using URLs in Private Message Content 26

VI. CLASS MEMBERS ARE ASCERTAINABLE 27

A. Class Members Can Be Identified Through EntShare Objects 27

VII. THE CODE FOR ANALYZING PRIVATE MESSAGES OPERATED
THE SAME FOR ALL USERS 29

VIII. “ORDINARY COURSE OF BUSINESS” 29

IX. “IN TRANSMISSION” 32

1 **I. QUALIFICATIONS**

2 1. As indicated in my *curriculum vitae*, attached hereto as Exhibit A, I have been a
3 professor in the College of Information Studies (“The iSchool”) at the University of Maryland
4 since 2007 (assistant professor from 2007-2013, associate professor with tenure to present),
5 where I have focused my research and teaching efforts on aspects of social media and the web.

6 2. I have been doing freelance professional web design and programming since 1993.
7 I worked as a web designer for the University of Chicago from 1995-2000. I operated my own
8 web design company, Gargoyle Web Design, from 1999-2001, which I closed when I began my
9 Ph.D. work.

10 3. I have taught university level classes on the web and social media, including:
11 “Analyzing Social Networks and Social Media,” “Social Networks: Technology and Society,”
12 “Development of Internet Applications,” “Fundamentals of Human-Computer Interaction,”
13 “Information Users in Social Context,” and “Small Worlds, Social Networks, and Algorithms.” In
14 addition, I have published and presented many articles in refereed journals and conferences, and
15 over 100 of these relate to social media and the web.

16 4. I received two Bachelor’s degrees, in Computer Science and Economics, from the
17 University of Chicago in 1999, a Master’s degree in Computer Science from the University of
18 Chicago in 2001, and a Ph.D. in Computer Science from the University of Maryland in 2005. My
19 Ph.D. thesis focused on social media and was titled “Computing and Applying Trust in Web-
20 based Social Networks.”

21 5. I have been teaching at universities on issues related to computer science, the web,
22 and social media since 1999 when I was a Lecturer in the Computer Science Department at the
23 University of Chicago. Over the past fourteen years, in a variety of different capacities, I have
24 taught classes at University of Chicago, George Mason University, Johns Hopkins University,
25 Georgetown University, George Washington University, American University, and University of
26 Maryland.

27 6. Through my research and studies, I have won a variety of awards including the
28 2015 University of Maryland Research Communicator Impact Award, 2015 University of

1 Maryland System Mentoring Award, Best Paper Award at the 2011 IEEE Social Computing
2 Conference, Best Paper Award at the 2009 International Semantic Web Conference, Research
3 Fellow for the Web Science Research Initiative (2008 – present), IEEE Intelligent Systems Ten to
4 Watch in May 2006, and the 2005 DARPA IPTO Young Investigator Award.

5 7. I also presented a TED talk titled “The curly fry conundrum: Why social media
6 ‘likes’ say more than you might think.”¹ It received 1.7 million views and was named one of
7 TED’s “Most Powerful Talks of 2014.”² TED (Technology, Engineering, Design) is a non-profit
8 organization that presents “Ideas Worth Spreading.” Videos of their invited presentations have
9 over half a billion total views.

10 8. I have authored over 100 scientific papers related to the web. Most recently, I have
11 authored two books on social media, entitled “Social Media Investigation” and “Analyzing the
12 Social Web.” Both books focus on various aspects of web and social media interaction, such as
13 using location-based services on mobile devices as well as interaction with friends for business
14 purposes. I have also authored other books including “Trust on the World Wide Web: A Survey”
15 and “Art Theory for Web Design.”

16 9. I have given expert testimony in the following proceedings:

- 17 • *Rembrandt Social Media LP v. Facebook Inc. et al*, No. 13-cv-00158
18 U.S. District Court for the Eastern District of Virginia
2013-2014 (plaintiff)
- 19 • *Peter Daou and James Boyce vs. Ariana Huffington, Kenneth Lerer and*
20 *Thehuffingtonpost.com*, No. 651997/2010
21 Supreme Court of The State Of New York, County of New York 2013-
22 2014 (plaintiff)
- 23 • *Blue Calypso Inc. v. Groupon Inc.*, No. 12-cv-00486,
24 U.S. District Court for the Eastern District of Texas
25 2014-2015 (plaintiff)

27 ¹ Available at
28 https://www.ted.com/talks/jennifer_golbeck_the_curly_fry_conundrum_why_social_media_likes_say_more_than_you_might_think?language=en.

² See <http://yearinideas.ted.com/2014/>.

1 10. A copy of my full *curriculum vitae* is attached as Exhibit A to this report. I am
2 being compensated at the rate of \$400 per hour for my services in this matter, and payment is not
3 contingent on the outcome of this proceeding.

4 **II. METHODOLOGY AND SUMMARY OF CONCLUSIONS**

5 11. I am submitting this report on behalf of the Plaintiffs. I have been retained as a
6 technical expert to study and provide my opinions regarding the topics discussed in paragraph 16
7 below. My opinions, as well as the evidence I rely upon to support them, are set forth in detail in
8 this report. The contents of the various exhibits that I identify by name are meant to be
9 incorporated, in their entirety, by such reference.

10 12. In preparing this report, I have employed methods and analyses of a type
11 reasonably relied upon by experts in my field in forming opinions or inferences on the subject.
12 The opinions expressed are based upon a reasonable degree of computer science certainty.

13 13. Between now and such time that I may be asked to testify before the Court, I
14 expect to continue my review, evaluation, and analysis of information generated during
15 discovery, as well as of relevant evidence presented before and/or at trial. I also expect to review
16 the reports submitted by Facebook's experts. I reserve the right to amend or supplement this
17 report, as necessary and as acceptable to the Court. I also reserve the right to develop materials
18 and exhibits as appropriate for use in helping to demonstrate and explain my opinions in the event
19 that I am asked to testify at trial.

20 14. In forming my opinions, I have reviewed source code which I understand was
21 provided by Facebook's counsel and which was represented as containing the relevant source
22 code between some time in 2009 and December 2012.

23 15. Additionally I have reviewed numerous internal Facebook documents produced in
24 this litigation, as well as certain public materials. The list of documents I have considered in
25 forming my opinions is attached to this report as Exhibit B.

26 16. I have been asked by the Plaintiffs through their counsel to opine on the following
27 issues:

- 28 a. The structure and function of Facebook's messaging system;

- 1 b. Facebook's interception of Private Message content, including:
- 2 i. Whether and what devices Facebook employs to intercept message
- 3 content;
- 4 ii. Whether the interceptions occurred in transit;
- 5 iii. Whether the interception of Private Message content was necessary
- 6 for Facebook to deliver private messages;
- 7 c. Facebook's subsequent use of that Private Message content;
- 8 d. Whether the class members can be readily determined based on Facebook's
- 9 own records; and
- 10 e. Whether the Facebook's uniformly processed Private Messages during the
- 11 relevant period.

12 17. Based on my review and analysis of Facebook's source code as well as internal

13 Facebook documents and deposition testimony, I conclude the following:

- 14 a. The structure and function of Facebook's messaging system is described in
- 15 detail in Section III below;
- 16 b. Facebook intercepted and redirected user's Private Message content using
- 17 various code-based devices while the message was in transit, and this interception was not
- 18 necessary for Facebook to deliver private messages;
- 19 c. Facebook used the intercepted Private Message content to provide
- 20 recommendations to Facebook users, and to provide analytics to third-party developers and
- 21 websites, as well as to increment the "Like" social plugin counter;
- 22 d. The class members can be determined from Facebook's own records using
- 23 various query methods and through self-identification; and
- 24 e. Facebook's source code operated consistently during the relevant period.
- 25
- 26
- 27
- 28

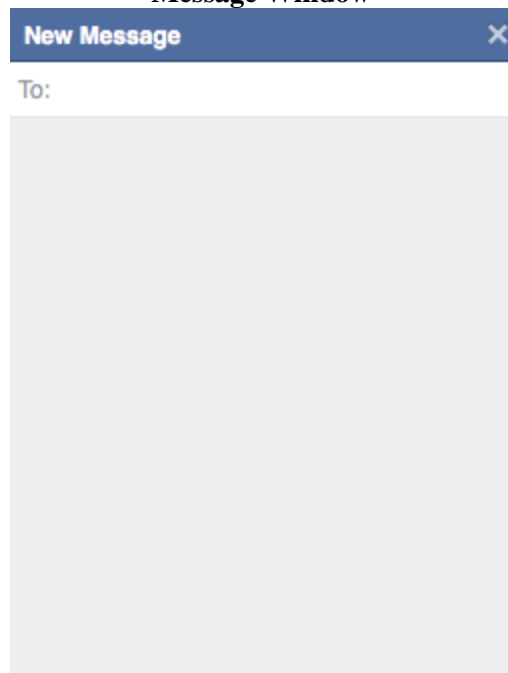
1 **III. FACEBOOK’S INTERCEPTION OF PRIVATE MESSAGE CONTENT**

2 **A. Facebook’s Private Message Architecture Functionality**

3 **1. Overview of Facebook’s Private Message Architecture**

4 18. An overview of Facebook’s Private Message architecture is useful. Say Alice is
5 sending a Private Message to Bob. In order to do so, Alice opens her Facebook message window
6 and begins to compose her message.

7 Figure 1
8 **Message Window**



9
10
11
12
13
14
15
16
17
18 19. She types her text and, if she types, pastes, or otherwise enters a URL into the
19 body of the message, Facebook detects that URL as she types. Once it sees a URL, it extracts the
20 URL from the message and sends it to the Facebook servers.³

21
22 20. Facebook describes this process in its Supplemental Responses and Objections to
23 Plaintiffs’ First Set of Interrogatories: “[I]f a user typed a URL into the text field of the Facebook
24

25
26
27 ³ Facebook’s servers are the computers on which the Facebook system operates. They store code
28 and data, run the code, provide web content, and manage back-end functionality. Essentially,
every part of Facebook other than the code that runs in the user’s browser is running on Facebook
servers, and those servers provide every element of Facebook that a user interacts with.

1 Messages product, and the user had JavaScript enabled in her browser, the JavaScript code
2 running in the user's browser may have detected the existence of a URL.”⁴

3 21. The vast majority of web users have JavaScript enabled. In 2010, Yahoo!
4 engineers issued a report stating that 1-2% of traffic came from users without Javascript enabled.⁵
5 Those numbers appear to have remained relatively stable over time. A 2013 analysis showed
6 about 1% of users were not accessing JavaScript-based content.⁶ Thus, 98-99% of users have
7 JavaScript active and this Facebook code would run in their browsers.

8 22. The URL detection process is also described by Ray He, an engineer at Facebook.
9 In his September 25, 2015 deposition (He Depo.), Mr. He states:

10 A. When the user types in a URL, the client
11 side code will, this is the Java script, running on
12 the user's browser, would detect that they entered a
13 URL and will attempt to create an attachment for
14 them to send.⁷

15 23. Based on my analysis of Facebook's source code (the “Code”), this process
16 appears in the [REDACTED] files, as follows:

17 a. In [REDACTED] the ability to detect typing (key press and paste) event is
18 enabled in [REDACTED] This processes those keystrokes, in part with the function
19 ‘URLScrapper.check.’

20 b. [REDACTED] checks if it should do a URL check and performs
21 the check if so. If a URL is detected, then it lets other code know that this has occurred, and it
22 calls that code along with the matched URL.

23 c. Then, in [REDACTED] the function
24 [REDACTED] sees that a URL was detected, and performs the URL
25 scrape request call.⁸ This initiates the process of scraping the URL.

26 ⁴ *Id.* at 12:26 – 13:2.

27 ⁵ *See*

28 <https://web.archive.org/web/20101016010319/http://developer.yahoo.com/blogs/ydn/posts/2010/10/how-many-users-have-javascript-disabled/>

⁶ *See* <https://gds.blog.gov.uk/2013/10/21/how-many-people-are-missing-out-on-javascript-enhancement/>

⁷ He Depo. at 187:7-11.

⁸ FB000027054; FB000027055.

1 24. After this Code detects that Alice has typed a URL in her Private Message, a
2 request is sent to Facebook’s servers to retrieve information related to the URL. One of the
3 purposes of retrieving this information is to create a URL “preview” within the Private Message.
4 Facebook describes the preview as “a brief description of the URL and, if available, a relevant
5 image from the website.”⁹

6 25. The process of detecting the URL within a Private Message, executing Code to
7 find information about the URL, and then processing that information in Alice’s message window
8 employs what Facebook refers to as a “share scraper” or “scraper.”¹⁰

9 26. As mentioned above, in [REDACTED], the function
10 [REDACTED] performs the URL scrape request call when a URL is
11 detected. This is a call to [REDACTED] [REDACTED] is the API¹¹ call handler.
12 In this file, the URL preview is rendered from a collection of information about the URL,
13 including URL scrape information, returned by a call to [REDACTED] in the file
14 [REDACTED]. The result from the [REDACTED]p file is sent, using AJAX,
15 back to the browser. The function [REDACTED] in
16 [REDACTED] is the handler for a successful response to the URL scrape request.¹²

17 27. The preview then appears as part of the message that the Alice is composing
18 (“When the URL preview was generated, it was displayed for the message sender before sending
19 the message.”).¹³

24 _____
25 ⁹ Facebook’s Supplemental Responses and Objections to Plaintiffs’ First Set of Interrogatories at
26 13:4-5.

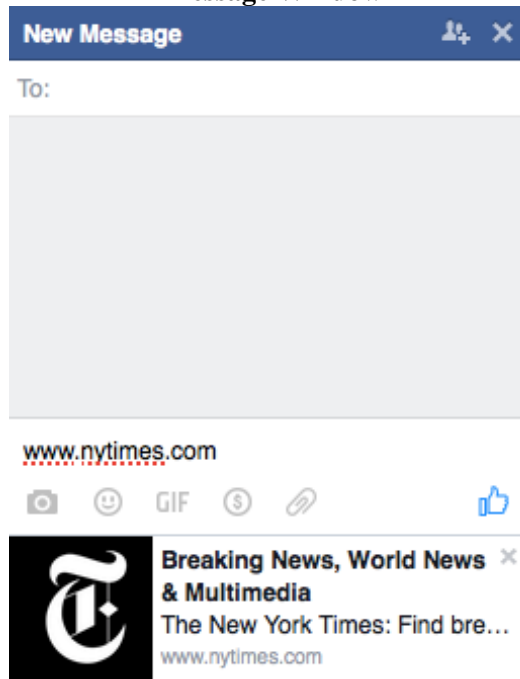
26 ¹⁰ The “share scraper” is analogous to the “web crawler” referenced in Plaintiffs’ Consolidated
27 Amended Complaint (“CAC”).

27 ¹¹ API stands for “Application Program Interface.” It’s a set of code one can use to interact with a
28 system (Facebook in this case).

28 ¹² FB000027055

28 ¹³ Facebook’s Supplemental Responses and Objections to Plaintiffs’ First Set of Interrogatories at
13:19-20

Figure 2
Message Window



28. However, this preview in Alice’s message is not the only result of the data structure created by Facebook’s Code. The preview returned is actually part of an attachment to the message, so while a preview is rendered visually in Alice’s message window, this attachment is “separate and distinct from the message itself.”¹⁴

29. As described in further detail below, Facebook has pulled data related to this URL from a “global share object,” which is a data structure that Facebook uses to track its users interactions with URLs across the Web. If no global share object existed prior to Alice’s typing the URL into her Private Message, Facebook’s share scraper will create a new global share object.

30. When Alice finishes the message and hits send, both the text of her message and the URL attachment are sent to Facebook’s servers. In a series of steps, detailed further below, Facebook processes the message and attachment, ultimately delivering the message to Bob. For that high level message sending to happen, there are many sub-processes that have to take place.

¹⁴ Facebook’s Supplemental Responses and Objections to Plaintiffs’ First Set of Interrogatories at 14:5.

1 Michael Adkins, a Facebook engineer, provides a broad overview of this transmission process in
2 his October 28, 2015 deposition (Adkins Depo.):

3 Messages are sent from clients to our edge of our network where
4 they are directed to a specific Web server based on availability.
5 That Web server is the one that runs the php code we are currently
6 looking at. It accepts the message from the client, performs its
7 necessary processing on the message while it is resident in memory,
8 and then determines the next internal destination to send the
9 message. The next internal destination to send the message would
10 typically be what we refer to as the message's back end or
11 application server where all the user mailboxes are stored. As you
12 can imagine, that is a fairly large complex of machines. So it is one
13 of the functions of the Web server and a connection manager that it
14 uses to determine which specific set of application server machines
15 to send the message to, specifically the ones that are currently
16 caching the sender and recipient's mailboxes. It sends it on to one
17 of those machines, which then likewise accepts it, stores it
18 temporarily in memory, performs its necessary data processing, and
19 then ultimately deposits it to storage, which is a system called
20 Hbase which is an open source database system. At that point in
21 time the message is delivered or considered delivered.¹⁵

22 31. The focus of this report, which is the interception and acquisition of the URL
23 attachments in Private Messages, occurs early in the above-described transmission, before the
24 message arrives in Hbase and is considered delivered.

25 **B. Facebook's Interception and Logging of Private Message Content**

26 **1. Creation of Share Objects**

27 32. Facebook has large and complex data behind its site. They store this in a data
28 model called TAO (The Associations and Objects).¹⁶ As the name suggests, there are two pieces
in this model: objects and associations.

33. Objects represent *things* on Facebook – users, pages, checkins, comments,
locations, etc. Associations represent *relationships* between objects. Those could be friendships
between users, a like that connects a user to a page, or a location that is tied to a user check-in.

34. There are a number of objects that Facebook creates in the process of scanning
Private Messages that include URLs. Two of these are user URL share objects and global URL

¹⁵ Adkins Depo. at 67:23-69:1. Similarly, Ray He stated in his deposition that “[t]here are many systems that the user-specific message information would have to go through” before “end[ing] up in the persistent storage.” He Depo. at 204:21-24

¹⁶ See <https://www.facebook.com/notes/facebook-engineering/tao-the-power-of-the-graph/10151525983993920>

1 share objects. The user URL share object contains details about the specific user's interaction
2 with the given URL, while the global URL share object contains information related to all
3 interactions between Facebook users and the given URL.

4 35. As described in the previous section, when Facebook is generating the preview for
5 a URL in a user's message window, it sends a request to Facebook servers to see if there is
6 already information that Facebook has logged about the URL (the global URL share object). It is
7 information from this global share object that is used to generate the preview and the
8 accompanying message attachment. If no global URL share object exists, Facebook's scraper
9 goes to the web page associated with the URL and collects data to create a new global URL share.
10 ("[I]f information to generate the URL preview was not available already on a Facebook server, a
11 Facebook server may have sent a request to the website, generated an image and description if
12 available, and delivered those components to the user's browser to generate a URL preview.")¹⁷

13 36. Based on my analysis of Facebook's Code, this is the process for the URL scrape,
14 if a global URL share object does not already exist:

15 a. [REDACTED] Makes the top-level call to get the URL
16 scrape data. [REDACTED] calls function
17 [REDACTED] to get either cached URL scrape data, scrape data from the
18 global URL share, or perform a new URL scrape.

19 b. [REDACTED]: Makes call to get the URL scrape data. Function
20 [REDACTED] to get
21 either cached URL scrape data or perform a new URL scrape.

22 c. [REDACTED]: Makes call to get the URL scrape data.
23 [REDACTED] to check for cached URL scrape or
24 scrape data from global URL share.

25 d. [REDACTED]
26 [REDACTED]

28 ¹⁷ Facebook's Supplemental Responses and Objections to Plaintiffs' First Set of Interrogatories at 13:8-11

1 e. [REDACTED]
2 [REDACTED] to perform a URL scrape if no suitable URL scrape data
3 found in the cache or the global URL share.

4 f. [REDACTED]: Performs a URL scrape. 1) [REDACTED]
5 [REDACTED], which performs the URL scrape
6 using a [REDACTED] and a [REDACTED].¹⁸

7 37. This scraping process creates a new global URL share object, known in this case
8 as an EntGlobalShare object.¹⁹

9 38. The EntGlobalShare also contains a number of tracking information fields,
10 including “share_count,” “post_count,” “like_count,” “comment_count,” and “click_count.”
11 These counts each represent the number of times Facebook users have engaged in a specific
12 action related to the URL at issue.²⁰

13 39. When the user sends a Private Message containing a URL, whether it is new to
14 Facebook or not, the share_count field of the EntGlobalShare is incremented. In other words, the
15 count that indicates how many times the URL has been shared goes up by 1. The process for this
16 is as follows.

17 40. After the user hits “send” but before the message is delivered, the Facebook Code
18 processes information about the sent message. Specific to this litigation, the Code searches for
19 message attachments created from Private Message URLs and creates user-specific share objects.
20 These user URL share objects are recorded in an EntShare object. According to Facebook’s
21 internal documentation, “An EntShare represents a user or page post from a composer that also
22 attaches another object such as an external URL or another post on Facebook.”²¹ In the case of
23

24 _____
¹⁸ FB000014199.

25 ¹⁹ In some cases, this includes a pointer to the user who initiated the private message as the
26 “creator” of the global URL share, known in this case as an EntGlobalShare object. *See*
27 Facebook’s Second Supplemental Responses and Objections to Plaintiffs’ Narrowed Second Set
28 of Interrogatories at 14:5-6: “The EntGlobalShare includes a field for ‘creator,’ which sometimes
includes a reference to the Facebook user whose action resulted in the creation of the Global
Share Object.”

²⁰ FB000014204.

²¹ FB000011543.

1 Private Messages, the EntShare represents a URL detected by Facebook software monitoring the
2 keystrokes typed by the user while composing a private message.²²

3 41. The creation of the user URL share object (and related EntShare) occurs early in
4 the message transmission process. As discussed in greater detail in Section III.B, *infra*, the Code
5 in [REDACTED] is executed. This calls the function
6 [REDACTED] which creates a user URL share object, links it to the global
7 URL share, and increments the global URL share “tracking_info” share count.

8 42. Based on my analysis of Facebook’s Code and documents, in my opinion, and as
9 discussed further below, the creation of the user URL share object and related EntShare, and
10 increase in the share_count in the EntGlobalShare’s tracking_info field constitute the
11 interception, analysis, and use of the contents of user’s Private Message.

12 2. Logging of Private Message Content

13 43. Once Facebook intercepts the URL contents of users’ Private Messages, in the
14 form of user URL share objects and EntShares, it logs that content in numerous ways, including
15 in various tables.

16 a. Share stats

17 44. Facebook’s Code, as well as Facebook’s internal documents, indicate that when a
18 user has shared a URL in a Private Message, this share was logged and stored in a table called
19 share_stats.

20 45. The share_stats table records the user ID, an action that user has taken (like a share
21 or like), the time of that action, and pointers to data structures that have more information about
22 the URL, in this case sent through a Private Message. With this data, Facebook can expose URL
23 shares from private messages in a variety of ways. The URLs people share privately may appear
24 to other users, may be searchable, and may be used to make recommendations for others.
25 Facebook has used private message data in this way in the past.

26 46. For example, on December 3, 2010, a Facebook engineer named Xin Liu noted
27 that functionality within Facebook’s platform was publicly displaying Private Message content.²³

28 _____
²² An example of the data represented in an EntShare object is FB000005528.

1 The particular Facebook functionality at issue in this document is “Taste,” which Facebook
2 documents describe as “recommendation systems for discovery.”²⁴ Ray He further explains that
3 “Taste is a back end for providing recommendations” and that “[a] recommendation is a link,
4 typically, a link that we think a user would find relevant.”²⁵

5 47. Concerning the public display of Private Message information via Taste, Xin Liu
6 discussed “post-processing step[s]...for the social activities returned from the Taste backend. As
7 we don’t have the is_posted attribute logged in share_stats, the taste recommendation results may
8 contain non-posted shares (from messaging etc), we should exclude those private shares.” This
9 is_posted attribute indicates if a message was posted to a public area (e.g. timeline) or not (e.g. in
10 a message). Because the attribute was not included in the share_stats table, Private Messages
11 content was used by Taste. This is further corroborated by a test Liu ran, consisting of “send[ing]
12 a message with a shared URL to another testing user...without [adding the is_posted attribute] the
13 share was shown in the recommendations results.”²⁶ This could only be the case if Private
14 Messages were indeed logged in the share_stats table.

15 48. Indeed, Xin Liu confirms that Private Message shares are logged to share_stats in
16 a later communication, dated February 10, 2011 and titled “Recommendations fallback of the
17 activity plugin may leak private shares,” in which Liu states “In share stats we logging [sic] all
18 shares (including posts and non posts), so Taste picks up both.”²⁷

19 49. In the Facebook Code base, the [REDACTED] contains a message that also
20 supports this. It begins with this comment: “Is_posted field in share_stats is available since
21 2010-12-07. It means that the share is a separate post, not a private share through message.”²⁸

22 50. Again, the presence of the is_posted field to differentiate Private Message shares
23 from other shares indicates that Private Message shares must be present in the table.
24
25

26 ²³ FB000002651.

27 ²⁴ FB000003118.

28 ²⁵ He Depo. at 227:3-4, 11-12.

²⁶ FB000002651.

²⁷ FB000002843.

²⁸ FB000014183.

1 51. While the addition of the is_posted attribute is now used to separate out private
2 message shares, Facebook could still use information from the Private Messages in the future
3 since they continue to collect all of this data in share_stats.

4 **b. Nectar**

5 52. Nectar is a platform Facebook uses for logging data. In Facebook document
6 FB000008505, Facebook employees describe the “the structure/tracking of likes”. In this, they
7 indicate that “Relevant actions that create relationships / show clickable links” include posting
8 messages on Facebook’s “Inbox (sending a link to a friend via inbox).” The Inbox is part of the
9 private message interface.

10 53. In the same document describing this data collection, they list “Places we log the
11 data”, which includes “nectar_platform ; nectar_content_action ; [link stats].”

12 54. When a URL is scraped or a pre-scraped URL is accessed, Facebook logs the
13 event in Nectar. This is handled by [REDACTED]. The logger class is
14 [REDACTED], and the details include the user ID and the URL.

15 **C. Facebook’s Use Of Code-Based Devices To Intercept Private Message**
16 **Content**

17 55. As discussed above, Facebook employs various code-based devices to intercept
18 Private Message content. Set forth below are the discrete components of Facebook’s Code that
19 execute the interceptions, each of which operate as separate devices, i.e., they each perform
20 separate and unique functions, and their deletion from the Code would still leave intact the
21 functioning of the other devices used to process and deliver the messages:

- 22 • Processes the attachment to create share objects:
 - 23 ○ After a user sends a message, the Code processes the URL attachment and
24 creates and EntShare object. As described in paragraph 41,
25 [REDACTED] is executed when the message is sent.
26 This calls the function [REDACTED], which creates a
27 user URL share object, links it to the global URL share, and increments the
28 global URL share “tracking_info”share count.

- Logs data about the private message share for later use:
 - As described in section III.B.2 above, Facebook logs information about the URL share in the share_stats table as well as in Nectar. In the latter, the logging is handled by [REDACTED]. It logs a [REDACTED], and the details include the user ID and the URL.
- Increments counters that track private message activities:
 - As described more detail in in paragraph 84 below, the counter in the EntGlobalShare is incremented. The specific line that does this calculation is in [REDACTED]. The value is incremented with this line: [REDACTED].

IV. FACEBOOK’S USES OF INTERCEPTED PRIVATE MESSAGE DATA

A. Facebook Used Private Message Content To Push Content To Users Via Its Recommendation Algorithms And Other Features

56. With the data Facebook collected by scanning Private Messages, Facebook then used this to recommend content for other users to visit. This is a direct use of the Private Message content outside the context of Private Messages. Specifically, Facebook used that data in external plugins that appeared on third party sites and in Facebook API calls.

1. Facebook Provided External Recommendations Using Private Message Content with ExternalNodeRecommender

57. As described above, the tracking information from the global URL share objects included counts of how often a URL was shared – including counts from private messages. These counts were used in the Code by a file called [REDACTED]. This file uses the counts to rank URLs to recommend sites to other users.

58. [REDACTED] calculates a score for each URL. The Code for this is as follows:

[REDACTED]

1 59. In this code, [REDACTED] comes from the [REDACTED] information stored in
2 the global URL share object. It is the sum of the share count (which includes private message
3 shares) and post count. [REDACTED] is an extensive calculation. A comment in
4 the code says: “calculate the boosting factor based on how many friends of the user contributed to
5 the node.”²⁹ This “node” refers to the global URL share.

6 60. That score is then used to make recommendations. It is used in the
7 Recommendations widget and recommendations bar, which showed recommendations on
8 external pages, and in an API call in [REDACTED]³⁰ This use proves that private
9 message content was used to affect these external recommendations made to other users.

10 2. Taste

11 61. Taste is Facebook’s recommendation system that replaced
12 ExternalNodeRecommender. My review of the Facebook Code shows that the file
13 [REDACTED] replaced [REDACTED] as Facebook
14 shifted to using the Taste system for recommendations. This, along with other evidence, strongly
15 suggests that Facebook continued to use Private Message content to make recommendations as
16 they shifted to Taste.

17 62. As discussed above, Taste is a recommendation system that Facebook used to push
18 content to its users. Among its functionalities, it recommends links to people that Facebook
19 believes they might be interested in.

20 63. In deposition, Ray He explained that Taste was using counts that included share
21 objects created from private messages:

22 A. The internal share stat, in February 2011,
23 was incrementing for both posts and nonposts, I
 believe.

24 Q. So let me ask you about the external now.

25 A. The external share stat counted – which
 external field?

26 Q. Which external field is share stat
 reflected in?

27 A. There’s share count or total count.

 Q. Okay. Both.

28 ²⁹ FB000027029.

³⁰ FB000027051.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

A. I believe share count included just posts, and total count included both.
Q. And with respect to the internal share stat, was taste picking up both posts and nonposts?
A. The internal share stat taste would have been picking up both.³¹

64. Mr. He provided further testimony confirming that Private Message URL sends were used in Taste’s recommendations algorithm. When discussing how Taste and recommendations works, Ray He was asked whether he was “involved in drafting source code for purposes of identifying recommendations,” to which he replied “[w]ell we’ve previously established that I wrote the code to add a counter [for tracking Private Message sends], and I believe that code was indirectly used for recommendations...The counts were taken into account to assess the relative engagement or popularity of a given URL. More popular URLs are more likely to be recommended.”³²

3. Insights/Developer API

65. The Insights dashboard provides demographic information about people who have interacted with an external website. This includes interactions that took place in private messages.

66. In FB000007286, Facebook describes SharePro, a tool that allows people to see how often Facebook users have shared content on Facebook. Under “Phase 4” in that document, Facebook describes the information included in the Analytics API:

³¹ He Depo. at 234:14-25.
³² He Depo. at 229:19-230:6.

1 **Figure 3**
2 **(Facebook Document FB000007286)**

3 **Phase 4: Analytics API**

4
5 https://our.intern.facebook.com/intern/wiki/Platform_engineering/FBConnect/SharePro

6 Provides basic analytics through API for use by bit.ly et al:

7 Cuts interaction data by:

- 8
- 9 • Share, post (sent in message), comment, like
 - 10 • Male, female
 - 11 • Age range
 - 12 • Source (on/off facebook.com)
 - 13 • Time range

14 67. The “interaction data” described here includes information on when and how
15 people shared the content (i.e. URL) and information about the people. The first bullet point
16 shows that content “sent in message” is included in this data. It also shows that API users can
17 access that information, which includes data about private messages, broken down by age and
18 gender.

19 68. Facebook document FB000006178, which has the subject “SharePro brief spec,”
20 supports Facebook’s intention to show these demographics in the Insights dashboard. It states: “If
21 we can uniquely map a user ID as an owner of a URL/share ID (via some kind of authentication),
22 then building an Insights dashboard with demographics will be straightforward (not more than a
23 few days of work). Also super psyched for this.”

24 69. Section 4.2 of Facebook document FB000010688 describes “Domain Insights”:

1 **Figure 4**
2 **(Facebook Document FB000010688)**

3 **4.2 Domain Insights**

4 Domain Insights provides you with analytics around how people interact with your website
5 content, enabling you to present relevant content on landing pages and optimize your
6 advertising campaigns. Additionally, with real-time data, you can react more quickly and make
7 changes on your site to maximize traffic and engagement.

8 Domains Insights offers a consolidated view of key metrics for any website, even those that
9 have not implemented Facebook Platform. For example, if a user links to your site in their
10 Facebook status message, that data is included in the analytics for your domain. You can
11 access sharing metrics and demographic information per domain and per URL so you can
12 optimize your content for sharing and better tailor your content to your audience.

13 *How it works*

14 Domain Insights metrics include:

15 The document goes on to explain that the Domain Insights include “Demographic Insights:
16 Aggregated demographics on referral traffic from Facebook to your site.”

17 70. As described above, Kelly Winters stated how data tracking for social plugins was
18 recorded. This included “Relevant actions that create relationships / show clickable links,” which
19 in turn included “Inbox (sending message link to a friend via inbox).” She goes on to list where
20 this data is logged, including “nectar_platform...nectar_content_action...[link stats].” She also
21 lists where it is publicly shared: “In the product...in the like button...in the sharepro
22 button...Insights (UI)...search typeahead” and “Via API...Insights API (not real-time, shows
23 same as Insights UI)...Link stats (real-time)...Graph API.” *Id.*

24 71. This indicates that “sending message” actions like including URLs in Private
25 Messages are recorded in Nectar and are shared in, among other locations, Insights. These private
26 messages generate referral traffic, as described in FB000010688, and thus it is reasonable to
27 conclude that demographics of users sharing private messages are displayed Insights.

28 72. Facebook document FB000008722 also supports this. It describes “Insights for
Websites” and states that it provides descriptions of analytics for (1) Like button, (2) Comment
box, (3) Demographics, (4) Organic Sharing. Organic sharing may include sharing in private
messages.

73. In the “Demographics” section of FB000008722, Facebook explains that they
provide demographic information: “To help you tailor your content and products to your users,
we now provide demographic information for the interactions that occur on your site and on
Facebook. We display demographics for gender, age range, country, and language.”

74. Experiments by journalist Ashkan Soltani also suggest that Facebook was displaying demographic information about Private Message shares in the Insights Dashboard. FB000000298 summarizes his description of Facebook’s Private Message scanning as follows: “That said, user demographics of those who share via Facebook messages are included in the stats seen by page owners, according to Soltani. Here’s a screenshot of what that looks like:”

Figure 5
(Facebook Document FB000000298)



4. Activity Feed

75. Taste was also utilized by Facebook to show URLs shared in Private Messages to other users. The Facebook Activity Plugin allowed third parties to show recent activity in Facebook that related to their site:³³

³³ <https://web.archive.org/web/20101205130048/http://developers.facebook.com/docs/reference/plugins/activity>.

1 The Activity Feed plugin displays the most interesting recent
2 activity taking place on your site. Since the content is hosted by
3 Facebook, the plugin can display personalized content whether or
4 not the user has logged into your site. The activity feed displays
5 stories both when users like content on your site and when users
6 share content from your site back to Facebook. If a user is logged
7 into Facebook, the plugin will be personalized to highlight content
8 from their friends. If the user is logged out, the activity feed will
9 show recommendations from your site, and give the user the option
10 to log in to Facebook.

11 The plugin is filled with activity from the user's friends. If there
12 isn't enough friend activity to fill the plugin, it is backfilled with
13 recommendations. If you set the recommendations param to true,
14 the plugin is split in half, showing friends activity in the top half,
15 and recommendations in the bottom half. If there is not enough
16 friends activity to fill half of the plugin, it will include more
17 recommendations.

18 76. In early 2011, users discovered that links they shared in private messages were
19 appearing in the Activity Plugin results, even if those pages weren't otherwise accessible on the
20 web. Nick Bilogorskiy of Facebook wrote "A user reports that sending a message to a friend with
21 a secret URL exposes this URL if you search for that domain in this page:

22 <http://developers.facebook.com/docs/reference/plugins/activity>

23 You could use this to browser a 'private' photo sharing site, or see unpublished pages for stealth
24 startups if you wanted to monitor (if said startups were using FB to mail each other)."³⁴

25 77. In response, Facebook employee Xin Liu stated "...in share stats we logging [sic]
26 all shares (including posts and non posts), so Taste picks up both, we did add that signals to the
27 scribe logs, but haven't picked up that yet. The old fix prevented from showing 'show shared that
28 URL', so the whole fix should be if this is a private share, we should not even show the URL! I
can work on a part fix to not show the URL if someone of your friend shared this secretly. A real
fix should be we don't even index the URL if it's a private share. We'll do that in another round
of index build."³⁵

³⁴ FB000002843.

³⁵ *Id.*

1 78. This exchange demonstrates that shared URLs within Private Messages were not
2 treated differently than public shares, and as a result, evidence of that private activity was visible
3 to others.

4 **5. API Queries**

5 79. Private Message data through URL share counts was also available through the
6 Facebook API. Facebook document FB000008643 explains that anyone could pull those counts
7 through the API:

8
9 “This data is OPEN – anyone can access it...It can be done like
10 this: Ask for the data on any URL like so:
11 https://api.facebook.com/method/fql.query?query=select%20%20like_count,%20total_count,%20click_count%20from%20link_stat%20where%20url=%22http://techcrunch.com/2011/06/07/investors-fred-wilson-chris-dixon-and-david-lee-on-software-patents-get-rid-of-them-video/%22

12
13 “This will return XML like this:
14 <fql_query_response_list=“true”> <link_stat>
15 <like_count>12</like_count> <total_count>28</total_count>
16 <share_count>16</share_count> <click_count>0</click_count>
17 </link_stat><fql_query_response>“

18 80. Facebook document FB000008499 describes the data that can be seen from Graph
19 API, link_stat, and Insights, respectively:

20 **Figure 6**
21 **(Facebook Document FB000008499)**

22 Graph API + link_stat – return same five fields:
23 1/ share_count – total number of full share stories published
24 2/ like_count – total number of likes – if this is an og page this means # of fans, if its not it means just # who have liked it
25 3/ feedback_count – total amount of feedback given on stream stories published
26 4/ total_count – sum of 1-3
27 5/ click_count – clicks from FB back to url

28 81. For the Graph API and link_stat, the numbers in “share_count” include the shares
from private messages. That means these counts are used in “total_count” as well. The document
goes on to say “Insights...takes the metrics above and breaks them down more granularly.”

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

B. Incrementing Like Counter

82. On October 3, 2012, the Wall Street Journal reported that Facebook was scanning users' private messages.³⁶ They detected this by observing that the like count on an external page would increase by two every time the page's URL was sent in a private message.

83. They tested this by creating pages and observing the count on the external like button increase by two every time the link was sent in a private message. The double counting was also visible on the insights page for webmasters, which shows analytics information.³⁷

84. The variable that tracked private message shares was called share_count. Based on my analysis of the Code, this is the process by which the share_count was incremented:

```
'SendMessageControllerFactory::createFromRequest(...)': Creates controller for PM send
[Redacted code block]
```

³⁶ <http://blogs.wsj.com/digits/2012/10/03/how-private-are-your-private-messages/>.
³⁷ <https://developers.facebook.com/blog/post/476>.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28

[REDACTED]

85. After media reports surfaced the double-counting issue and the fact that private messages were scanned and hidden “likes” were counted as a result, Facebook began an internal process to address the issue. This was not a process of fixing a bug; as described below, counting private message shares toward the like count for a URL was intended behavior. Rather, Facebook’s changes were a response to the public reaction at seeing their private messages scanned. Indeed, instead of stopping the scanning of private messages, Facebook simply hid that activity from the public to limit the privacy concerns.

86. In Facebook document FB000002141, Facebook discusses whether or not it is a bug that Private Message shares are used in the external like count. Alex Himel replied to these questions on October 4 and confirmed that Private Messages are scanned and that it is intentional to show the counts from private message shares in the external like counter. He stated: “Yeah, this is by design. Sending a private message increases the like count....*This is not new behavior,*

³⁸ FB000027018.

1 *nor is the discussion over whether or not a “like” should indicate positive association or just*
2 *sharing.”*

3 87. Facebook then set out to determine what percentage of “likes” were a result of
4 private message shares. Alex Himel reported on October 16, 2012 1:56 PM that his experiments
5 showed 0.5%-4% of likes came from private message shares.³⁹ Code for these experiments is
6 included in Himel’s declaration as Exhibit E.⁴⁰

7 88. Because the magnitude of shares from private messages would not significantly
8 affect the like count (a concern expressed in FB000002190 when initial experiments incorrectly
9 showed very high percentages), Facebook resolved to remove the private message shares from the
10 external like count. This is expressed in Exhibit F of Alex Himel’s declaration (FB000001606) in
11 the summary field, as well as in the email exchange in Facebook document FB000002196, which
12 also makes no mention of the Code changes impacting the way in which messages are sent or
13 received.

14 89. Indeed, the described change to the Code simply moved public posts, like ones a
15 user would make on his or her wall or timeline, into a post_count variable and tracked private
16 message shares in the share_count variable. The post_count variable is what was then displayed
17 as the public like count.

18 90. Changes in what number is shown as a “like” count do not impact the way that
19 Facebook handles private messages in any way. The Code change that eliminated private
20 message shares from the total share count, mentioned above, was essentially a change in one line
21 of Code. That line of Code was not part of the messaging system but rather a line that determined
22 which numbers to display publicly.

23 91. This is further highlighted in Facebook document FB000006429. That document,
24 which discusses adjusting the number displayed as the total “like” count, emphasizes that the
25 Code change required to adjust this number is minimal. Mike Vernal writes in that document that
26
27

28 ³⁹ FB000002196.

⁴⁰ FB000001599.

1 removing shares from Like count is “0.1% a code change and 99.9% messaging / PMM / etc.
2 change.”

3 92. Note that in the changes discussed above, Facebook never decided to stop *counting*
4 private message shares nor did they suggest they would change the process of scanning the
5 messages. They simply separated the count of wall posts and private message posts into two
6 variables, and excluded the private message share count from the value shown on the external
7 share button.

8 93. This is supported in an email from Alex Himel to CEO Mark Zuckerberg, which
9 read: “Heads up: planning on dropping private message sends from contributing to the like button
10 count for URLs, effective tomorrow afternoon....Context is we added/re-added a handful of
11 separate metrics around activity with urls a few weeks ago to boost the count displayed on the
12 like button. This particular one got the attention of the press because it was...viewed as
13 creepy.”⁴¹

14 **V. FACEBOOK’S CONDUCT CONTINUES TO THE PRESENT**

15 **A. Facebook Has Not Ceased Its Practice Of Intercepting, Analyzing, and Using** 16 **URLs in Private Message Content**

17 94. In addressing the issue of removing private message shares from the like count,
18 Facebook adjusted their Code. This removed the share_count variable from being included in the
19 external message_count. This appears redacted in FB000001606. However, there is no evidence
20 that Facebook ever stopped incrementing the share_count with private message shares.

21 95. Instead, evidence from the Code shows that Facebook continued to analyze and
22 record information from Private Message shares at least through December 31, 2012 (the last date
23 for which we had access to source Code). I analyzed the files

24 [REDACTED]
25 [REDACTED], which are all part of the core process of
26 recording Private Message shares. There were no substantial changes to these files, and they
27 continued to record the private message shares up until the latest date in the Code.

28 _____
⁴¹ FB000000425.

1 96. Further, internal Facebook documents indicate that Facebook continued to create
2 user URL share objects, store those share objects as EntShares, and associate those EntShares
3 with the share_count in the tracking_info field of EntGlobalShares as late as 2014. My
4 understanding is that Facebook produced several EntShares and EntGlobalShares related to
5 specific Private Messages sent or received by Plaintiffs Campbell and Hurley, and that these
6 messages spanned a period from 2009 to 2014. One of these Private Messages was sent to
7 Plaintiff Hurley on April 20, 2014, and from the URL in that message, Facebook created an
8 EntShare⁴², which has an association with the EntGlobalShare for the message's URL.⁴³

9 97. With that information available, Facebook could begin using it at any point to
10 target advertisements, to generate recommendations, to build demographic information for
11 Insights pages, or to reveal it in other ways.

12 **VI. CLASS MEMBERS ARE ASCERTAINABLE**

13 **A. Class Members Can Be Identified Through EntShare Objects.**

14 98. Each EntShare contains information that indicates the EntShare was created from a
15 Private Message, and it indicates the user whose actions created it.

16 99. In the Code, the following four attributes show that the EntShare was created from
17 a Private Message.

18 ■ [REDACTED]

19 ■ [REDACTED]

20 ■ [REDACTED]

21 ■ [REDACTED]

22 ■ [REDACTED]

23 ■ [REDACTED]

24 ■ [REDACTED]⁴⁴

27 ⁴² FB000005827.

28 ⁴³ FB000005802-R.

⁴⁴ FB0000027020.

1 100. The creator of these private EntShares can also be determined. Each user's unique
2 Facebook ID number is present in the EntShare, as indicated in the "OwnerID" and "CreatorID"
3 field as shown below in FB000008499:

4 Figure 7
(Facebook Document FB000008499)

6 ▲ EntShare: 118079288286238

7

8 Fields Showing: All values

9 OwnerID	1556441609	ID
10 CreatorID	1556441609	ID

11 101. This ID, [REDACTED] belongs to Michael Hurley, which can be verified by going
12 to [https://www.facebook.com/\[REDACTED\]](https://www.facebook.com/[REDACTED]) That resolves to
13 [https://www.facebook.com/\[REDACTED\]](https://www.facebook.com/[REDACTED]) and Michael Hurley's homepage.

14 102. I understand that the Plaintiffs in this case seek to certify a class of "All natural-
15 person Facebook users located within the United States who have sent, or received from a
16 Facebook user, private messages that included URLs in their content (and from which Facebook
17 generated a URL attachment), from within two years of the filing of this action up through the
18 date of class certification."

19 103. To retrieve a list of class members, the Code process should be relatively
20 straightforward. A database query could be used to select the Facebook user IDs of everyone
21 whose actions had created an EntShare from a private message.

22 104. The exact code will vary based on the type of database, but example query code
23 could roughly take this form:

24 [REDACTED]
25 [REDACTED]
26 [REDACTED]

27 Where "name" is the Facebook user ID of the class member, and the field names and values
28 correspond to the above examples from the Code.

1 105. If database queries were not an option, direct code could be written to access the
2 data. For each share object, something like the following checks would determine if it were a
3 share generated from a private message. If so, the creator’s Facebook user ID could be selected:

4 [REDACTED]
5 [REDACTED]
6 [REDACTED]
7 [REDACTED]
8 [REDACTED]
9 [REDACTED]

10 106. Users could also self-identify as class members. In anyone’s message inbox on
11 Facebook, they can go back and see their old messages. These will indicate if a URL attachment
12 is present because it will have the URL and the attachment (or a message indicating the
13 attachment is no longer available) in the message.

14 **VII. THE CODE FOR ANALYZING PRIVATE MESSAGES OPERATED THE SAME**
15 **FOR ALL USERS**

16 107. As described above, I analyzed changes in the relevant portions of the Code over
17 the time period in question. The Code for analyzing private message shares operated in the same
18 way for all users. If any Facebook user with a JavaScript-enabled browser types in a URL to a
19 private message, Facebook will create an attachment. If the user then sends the message,
20 Facebook’s Code would analyze it and record it as described above.

21 **VIII. “ORDINARY COURSE OF BUSINESS”**

22 108. I understand that Facebook asserts that the above-described processes are
23 employed in the “ordinary course of business.” I further understand that in the context of the
24 claims that Plaintiffs assert, an electronic communications service provider such as Facebook
25 “cannot simply adopt any revenue-generating practice and deem it “ordinary” by its own
26 subjective standard.” *Campbell v. Facebook Inc.*, 77 F. Supp. 3d 836, 844 (N.D. Cal. 2014).
27 Instead, for an interception to fall within the scope of the defense there must be “some nexus
28 between the need to engage in the alleged interception and the subscriber’s ultimate business, that

1 is, the ability to provide the underlying service or good.” *Id.* (citing *In re Google Inc. Gmail*
2 *Litig.*, 2013 U.S. Dist. LEXIS 172784 (N.D. Cal. Sept. 26, 2013).

3 109. Having reviewed Facebook’s Code and the documents provided in discovery, I
4 conclude that the interception, analysis, and use of URL shares in Private Messages is not
5 necessary for the functionality of message sharing in Facebook.

6 110. Facebook itself confirms this in its Interrogatory Responses, where it notes that on
7 some occasions a message with a URL preview attachment may be sent, but no corresponding
8 EntShare object is created: “During the relevant time period, if a URL was included in a draft
9 message typed into the message text field on the Facebook website, and a URL preview
10 attachment was successfully created and not deleted, and the messages information (including the
11 URL preview attachment) was successfully received by a Facebook server, a Share Object
12 reflecting information about the URL preview attachment *may* have been created . . .”⁴⁵ Facebook
13 further states that “Share Objects . . . were *sometimes* created from share attachments that were
14 sometimes generated from URLs in messages.”⁴⁶

15 111. Facebook goes on to explain that the URL attachment might not be logged in a
16 variety of circumstances. This shows that the logging is not necessary for successful delivery of
17 the message: “If a URL attachment was successfully created (and not deleted by the user) prior to
18 the message being sent, then, after the message was sent and the message and components were
19 received and stored on a Facebook server, and if the message was not blocked in the course of
20 abuse- and security-related processing, the message event was logged in a number of ways, and
21 several records (‘share objects’) were created reflecting the fact that the message had a URL as an
22 attachment (a ‘URL share’).”⁴⁷

23 112. The Code also shows that these steps are unnecessary. When a message is sent
24 with an attachment, the user URL share and global URL share objects are not necessary to deliver
25 the content of the message with its URL to the recipient. The counts tracked in these objects are

26 _____
27 ⁴⁵ Facebook's Second Supplemental Response and Objections to Interrogatory No. 8 at 12:3-7
(emphasis added).

28 ⁴⁶ *Id.* 16:24-28 (emphasis added).

⁴⁷ Facebook’s Supplemental Responses and Objections to Plaintiffs’ First Set of Interrogatories at
15:10-15.

1 not used to deliver the message. The logging of the activity is not part of the message delivery
2 process. Instead, these processes are related to the acquisition of user’s Private Message content
3 for the purposes described above, such as fueling recommendations algorithms, offering third
4 parties analytics data, and inflating engagement counts on social plugins. None of those uses fall
5 within a “nexus between the need to engage in the alleged interception and the subscriber’s
6 ultimate business, that is, the ability to provide the underlying service or good.” *Campbell*, 77 F.
7 Supp. 3d at 844.

8 113. Additionally, testimony by Michael Adkins demonstrates that Facebook’s security
9 systems related to detecting spam, malware or criminal activity do not rely on the creation of
10 EntShare or GlobalEntShare objects or the logging of private message content described above.
11 As explained by Michael Adkins, Facebook’s “ [REDACTED] system is able to—and in fact does— [REDACTED]
12 [REDACTED]s, but does so through Code that is unrelated to
13 creating share objects or logging user’s sharing of URLs. For example, Mr. Adkins testified that
14 Facebook’s “ [REDACTED] security system [REDACTED]
15 [REDACTED] :

16 [REDACTED]
17 [REDACTED]
18 [REDACTED]
19 [REDACTED]

20 114. Mr. Adkins further notes that [REDACTED] accomplishes this through “ [REDACTED]
21 [REDACTED]⁴⁹ I agree that
22 [REDACTED] is a standard operation, one that in no
23 way relies on EntShare or GlobalEntShare objects or the logging of private message content
24 described above. Mr. Adkins further confirms this by explaining that [REDACTED] does not in fact
25 [REDACTED], but rather “ [REDACTED]
26
27

28 ⁴⁸ Adkins Depo. at 34:17-25.
⁴⁹ *Id.* at 36:15-18.

1 [REDACTED]⁵⁰ This indicates that the creation of EntShare
2 and GlobalShare objects is not part of the malicious URL detection software used by Facebook.

3 115. Similarly, Mr. Adkins testified that Facebook's [REDACTED] security software scans
4 private messages for spam by [REDACTED]

5 [REDACTED]
6 [REDACTED].⁵¹ This process likewise does not rely on the interception of Private
7 Message URLs or on the creation of EntShare or GlobalEntShare objects or the logging of private
8 message content described above.

9 **IX. "IN TRANSMISSION"**

10 116. I further understand that Facebook takes the position that the challenged practices
11 occurred "in storage," as opposed to "in transmission," and that they are therefore outside of the
12 scope of the statutes through which Plaintiffs bring their claims. My understanding is that an
13 interception must occur "contemporaneously with transmission" in order to have occurred under
14 either the Electronic Communications Privacy Act or the California Invasion of Privacy Act. *In*
15 *re Carrier IQ, Inc., Consumer Privacy Litig.*, 78 F. Supp. 3d 1051, 1076 (N.D. Cal. 2015). As
16 described above, all the redirection, analysis and logging of Private Message content happens
17 while the Private Message is in transmission – after the user has clicked send on the message but
18 before it is delivered to the recipient.

19 117. As the excerpt of the Adkins Deposition shows quoted in paragraph 30 above,⁵²
20 the message is delivered when it is stored in the Hbase database system. Until that point, the
21 message, and any URL attachment, are only held in memory, not in storage. Any information in a
22 computer system is in memory when it is not in storage; otherwise, it could not be in the
23 computer at all. In the testimony above, Adkins clearly describes a process by which the message
24
25

26 _____
27 ⁵⁰ *Id.* at 87:16-21 "... my question is, does [REDACTED]"

28 ⁵¹ *Id.* at 89:11-90:19.

⁵² *Id.* at 67:23-69:1.

1 is moving from one temporary place in memory to another until it is put in permanent storage and
2 delivered.⁵³

3 118. As described above, all the processing of the message, including creating objects
4 linking senders with URLs, logging, and count incrementing, happens before the message is
5 delivered. Thus, in my opinion, Facebook's interception and redirection of user's Private
6 Message content happens while the message is in transit and not while it is in storage.

7
8 Dated: November 13, 2015

9
10 

11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27 Jennifer Golbeck

28 ⁵³ Ray He's testimony also confirms this. *See* He Depo. at 206:4-6 ("The user-specific share object is similarly routed through Facebook's infrastructure before going into persistent storage.").

EXHIBIT A

Jennifer Golbeck

College of Information Studies (The iSchool)
University of Maryland
College Park, MD 20742, USA
E-mail: jgolbeck@umd.edu
Homepage: <http://www.cs.umd.edu/~golbeck/>

1 Personal Information

1.A University Appointments

- | | |
|----------------|---|
| 8/2013–present | Associate Professor,
College of Information Studies (100%),
University of Maryland (College Park, Maryland) |
| 8/2007–present | Assistant Professor,
College of Information Studies (100%),
University of Maryland (College Park, Maryland) |

1.B Education

- | | |
|---------------|--|
| 8/2001–5/2005 | University of Maryland (College Park, Maryland)
Doctor of Philosophy in Computer Science |
| 9/1999–6/2001 | University of Chicago (Chicago, Illinois)
ScientiæMagister in Computer Science |
| 9/1995–6/1999 | University of Chicago (Chicago, Illinois)
Scientiæ Baccalaureus in Computer Science
Artium Baccalaureus in Economics |

1.C Academic Employment Background

6/2005–8/2007	Faculty Research Associate Institute for Advanced Computer Studies Department of Computer Science University of Maryland (College Park, Maryland)
8/2006–12/2006	Adjunct Professor Computer Science Department American University (Washington, DC)
6/2005–9/2006	Research Director Joint Institute for Knowledge Discovery (JIKD) University of Maryland (College Park, Maryland)
8/2001–5/2005	Research Assistant Department of Computer Science University of Maryland (College Park, Maryland)
8/2001–5/2005	Adjunct Lecturer Computer Science Department George Washington University (Washington, DC)
6/2001–5/2003	Adjunct Lecturer Computer Science Department Georgetown University (Washington, DC)
5/2002–8/2002	Adjunct Professor Advanced Physics Lab Johns Hopkins University (Laurel, Maryland)
8/2001–12/2001	Adjunct Lecturer Computer Science Department George Mason University (Fairfax, Virginia)
6/2000–9/2000	Visiting Graduate Mathematics and Computer Science Division Futures Laboratory Argonne National Laboratory (Argonne, Illinois)
6/1999–6/2001	Lecturer Computer Science Department University of Chicago (Chicago, Illinois)

2 Research, Scholarly, and Creative Activities

- In all references, my name is in **bold**.
- Unless otherwise indicated, the first author is the lead author.
- Underlined names indicate students with whom I collaborated—this includes students for whom I am/was the (co-)advisor and other students where the collaboration was limited to specific projects.
- For work in which a student took the lead, it is customary for the student to be first author, followed by faculty who have played an advisory or mentoring role, followed by other individuals who have contributed. In cases where a student is listed as the first author, a wavy underline indicates colleagues with whom I shared this advisory or mentoring role (to the extent of my knowledge).
- References marked with ^α indicate that authors are listed in alphabetical order, or that all co-authors contributed equally.

2.A Books

2.A.i Books Authored

- B1. **Jennifer Golbeck**. January 2015. Introduction to Social Media Investigation: A Hands On Approach. Syngress.
- B2. **Jennifer Golbeck**. 2013. Analyzing the Social Web. Burlington, MA: Morgan Kaufmann.
- B3. **Jennifer Golbeck**. 2008. Trust on the World Wide Web: A Survey. Hanover, MA: Now Publishers Inc.
- B4. **Jennifer Golbeck**. 2005. Art Theory for Web Design. Boston, MA: Addison–Wesley.

2.A.ii Books Edited

- B5. **Jennifer Golbeck (ed)**. 2008. Computing with Social Trust, London, UK: Springer.
- B6. K. Aberer, K.-S.Choi, N. Noy, D. Allemang, K.-I. Lee, L. Nixon, **Jennifer Golbeck**, P. Mika, D. Maynard, R. Mizoguchi, G. Schreiber, P. Cudré -Mauroux(Eds.) The Semantic Web – 6th International Semantic Web Conference, 2nd Asian Semantic Web Conference (proceedings), Lecture Notes in Computer Science, Vol. 4825, November 2007.

2.A.iii Chapters in Books

- BC1. **Jennifer Golbeck**. 2015. “Who Needs an Untrustworthy Doctor? Maslow’s Hierarchy of Needs” in The Walking Dead Psychology: Psych of the Living Dead, Travis Langley (ed.). Sterling.
- BC2. Ziegler, Cai-Nicolas, and **Jennifer Golbeck**. ”Models for Trust Inference in Social Networks.” Propagation Phenomena in Real World Networks. Springer International Publishing, 2015. 53-89.

- BC3. **Jennifer Golbeck**, Ugur Kuter. 2008. “The Ripple Effect: Change in Trust and Its Impact over a Social Network” in *Computing with Social Trust*. **Jennifer Golbeck** (ed.). Springer.
- BC4. **Jennifer Golbeck**, Aaron Mannes, James Hendler, 2006. “Semantic Web Technologies for Terrorist Network Analysis,” in *Emergent Information Technologies and Enabling Policies for Counter Terrorism*. Robert Popp and John Yen (eds). Wiley-IEEE Press.
- BC5. **Jennifer Golbeck** and Paul Mutton, 2005. “Spring-embedded Graph Visualizations of Semantic Metadata and Ontologies,” in *Visualizing the Semantic Web*, 2nd Ed, Vladimir Geroimenko, Chaomei Chen (eds.). Springer Verlag.
- BC6. **Jennifer Golbeck**, 2004. “IRC with ChatZilla” in Paul Mutton, *IRC Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC7. **Jennifer Golbeck**, 2004. “IRC in Mac OS X” in Paul Mutton, *IRC Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC8. **Jennifer Golbeck**, 2004. “Getting Friendly with FOAFBot” in Paul Mutton, *IRC Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC9. **Jennifer Golbeck**, 2004. “Interrogate Trust Networks with TrustBot” in Paul Mutton, *IRC Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC10. **Jennifer Golbeck**, 2004. “Check the Weather” in Paul Mutton, *IRC Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC11. **Jennifer Golbeck**, 2004. “Convert Currency” in Paul Mutton, *IRC Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC12. **Jennifer Golbeck**, 2004. “Don’t Get Lost in Translation” in Paul Mutton, *IRC Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC13. **Jennifer Golbeck**, 2004. “IRC: Chatrooms for Hackers” in Rael Dornfest and James Duncan Davidson, *OS X Panther Hacks*, 2004. O’Reilly Associates: Cambridge, MA.
- BC14. **Jennifer Golbeck**, Amy Alford, Ron Alford, James Hendler, 2004. “Organization and Structure of Information using Semantic Web Technologies,” in *Handbook of Human Factors in Web Design*, Robert W. Proctor and Kim-Phuong L. Vu (eds.). Lawrence Erlbaum Associates, NJ.

2.B Articles in Refereed Journals¹

- | | |
|--|-------|
| J1. Jennifer Golbeck. Benford’s Law Applies to Online Social Networks. <i>PLoS ONE</i> . in press | 3.534 |
| J2. <u>Irene Eleta</u> and Jennifer Golbeck. Multilingual Use of Twitter: Social Networks at the Language Frontier. <i>Computers in Human Behavior</i> . December 2014 | 2.489 |
| J3. Jennifer Golbeck and Derek Hansen. A Method for Computing Political Preference Among Twitter Followers. <i>Social Networks</i> . 36: 20 pages, 2014. | 4.059 |

¹ The right column indicates ISI Impact factors of the journal in the year of publication, or most recently available impact factor otherwise. Missing values indicate that the impact factor is not available.

- J4. Rebecca LaPlante, Judith Klavans, **Jennifer Golbeck**. Subject Matter Categorization of Tags Applied to Digital Images from Art Museums *Journal of the American Society for Information Science and Technology*. 23 pages, in press. 2.137
- J5. Awalin Sopan, Manuel Freire, Meirav Taieb-Maimon, Catherine Plaisant, **Jennifer Golbeck**, and Ben Shneiderman. Exploring Data Distributions: Visual Design and Evaluation *International Journal of Human-Computer Interaction*, 29(2), 27 pages, 2013 0.943
- J6. **Jennifer Golbeck**, Jes Koepfler, Beth Emmerling. An Experimental Study of Social Tagging Behavior and Image Content. *Journal of the American Society for Information Science and Technology*, 62(9): 1750–1760, 2011. 2.137
- J7. **Jennifer Golbeck**. The more people I meet, the more I like my dog: A study of pet-oriented social networks on the Web. *First Monday*, 16(2): 12 pages. 2011
- J8. Xie, B., Watkins, I., **Golbeck, J.**, & Huang, M. Understanding and changing older adults perceptions and learning of social media. *Educational Gerontology*, (38)4: 282–296, 2011. 0.550
- J9. Ugur Kuter and **Jennifer Golbeck**.^α Using Probabilistic Confidence Models for Trust Inference in Web-Based Social Networks. *ACM Transactions on Internet Technology*, 10, 2, Article 8 (June 2010), 23 pages, 2010. 2.080
- J10. **Jennifer Golbeck**, Justin Grimes, Anthony Rogers Twitter Use by the US Congress. *Journal of the American Society for Information Science and Technology*, 61(8): 1612–162, 2010. 2.137
- J11. P. T. Jaeger, **J. Golbeck**, A. Druin, K. R. Fleischmann. The First Workshop on the Future of iSchool Doctoral Education: Issues, Challenges, and Aspirations. *Journal of Education for Library and Information Science*, 51(3):201–208, 2010.
- J12. Druin, A., Jaeger, P.T., **Jennifer Golbeck.**, Fleischmann, K. R., Lin, J., Qu, Y., Wang, P. & Xie, B. The Maryland Modular Method: An Approach to Doctoral Education in Information Studies. *Journal of Education in Library and Information Science (JELIS)*, 50(4), 293-301, 2010.
- J13. **Jennifer Golbeck** and Christian Halaschek-Wiener. Trust-Based Revision for Expressive Web Syndication. *Journal of Logic and Computation*. 19, 5 (October 2009), 771-790. 0.821
- J14. **Jennifer Golbeck**. Trust and Nuanced Profile Similarity in Online Social Networks. *ACM Transactions on the Web*, 3, 4, Article 12, 33 pages, 2009. 2.810
- J15. **Jennifer Golbeck**. 2008. Weaving a Web of Trust. *Science* 19 September 2008: 1640–1641. 29.78
- J16. James Hendler, **Jennifer Golbeck**. Metcalfe’s Law Applies to Web 2.0 and the Semantic Web. *Journal of Web Semantics*. 6(1): 14–20, 2008. 3.410
- J17. **Jennifer Golbeck**. The Dynamics of Web-based Social Networks: Membership, Relationships, and Change. *First Monday*, 12(11): 1-33, 2007.
- J18. **Jennifer Golbeck**, James Hendler. A Semantic Web and Trust Approach to the Provenance Challenge. *Concurrency and Computation: Practice and Experience*, 20(5): 431–439, 2007. 0.535

- J19. L. Moreau, B. Ludascher, I. Altintas, R. S. Barga, S. Bowers, S. Callahan, G. Chin Jr., B. Clifford, S. Cohen, S. Cohen-Boulakia, S. Davidson, E. Deelman, L. Digiampietri, I. Foster, J. Freire, J. Frew, J. Futrelle, T. Gibson, Y. Gil, C. Goble, **J. Golbeck**, P. Groth, D. A. Holland, S. Jiang, J. Kim, D. Koop, A. Krenek, T. McPhillips, G. Mehta, S. Miles, D. Metzger, S. Munroe, J. Myers, B. Plale, N. Podhorszki, V. Ratnakar, E. Santos, C. Scheidegger, K. Schuchardt, M. Seltzer, Y. L. Simmhan, C. Silva, P. Slaughter, E. Stephan, R. Stevens, D. Turi, H. Vo, M. Wilde, J. Zhao, and Y. Zhao. The First Provenance Challenge. *Concurrency and Computation: Practice and Experience*, 20(5): 409–418, 2007. 0.535
- J20. Cai-Nicolas Ziegler, **Jennifer Golbeck**. Investigating Interactions of Trust and Interest Similarity. *Decision Support Systems*, 43(2): 460–475, 2006. 1.190
- J21. Richard J. Williams, Neo Martinez, **Jennifer Golbeck**. Ontologies for Ecoinformatics, *Journal of Web Semantics*, 4(4): 237–242, 2006. 3.410
- J22. **Jennifer Golbeck**, James Hendler. Inferring Trust Relationships in Web-Based Social Networks, *ACM Transactions on Internet Technology*, 6(4): 497–529, 2006. 0.893
- J23. **Jennifer Golbeck**, Bijan Parsia. Trust network-based filtering of aggregated claims. *International Journal of Metadata, Semantics, and Ontologies*, 1(1); 58–65, 2005.
- J24. **Jennifer Golbeck**. Semantic Social Networks for Email Filtering: A Prototype and Analysis, *AIS SIGSEMIS Bulletin*, Vol. 2, Issue (3&4) 2005: 36–40, 2005.
- J25. Frank W Hartel, Sherri de Coronado, Robert Dionne, Gilberto Fragoso, **Jennifer Golbeck**. Modeling a Description Logic Vocabulary for Cancer Research. *Journal of Biomedical Informatics*, 38(2): 114–129, 2005. 1.792
- J26. P. Domingos, **J. Golbeck**, P. Mika, A. Nowak. Trends & Controversies: Social Networks and Intelligent Systems. *IEEE Intelligent Systems*, 20(1): 80 – 93, 2005. 1.438
- J27. Staab, Steffen, Pedro Domingos, P. Mika, **Jennifer Golbeck**, Li Ding, Tim Finin, Anupam Joshi, Andrzej Nowak, and Robin R. Vallacher. Social networks applied. *IEEE Intelligent Systems*, page 80-93, 2005.
- J28. Aditya Kalyanpur, **Jennifer Golbeck**, Jay Banerjee, James Hendler. OWL: Capturing semantic information using a standardized web ontology language. *Multilingual Computing & Technology*, 15(7): 8 pages, 2004.
- J29. Leslie E. Chipman, Benjamin B. Bederson, **Jennifer Golbeck**. SlideBar: Analysis of a linear input device. *Behaviour and Information Technology*, 23(1): 1–9, 2004. 1.028
- J30. **Jennifer Golbeck**, Gilberto Fragoso, Frank Hartel, Jim Hendler, Jim Oberthaler, Bijan Parsia. The National Cancer Institute’s Thesaurus and Ontology. *Journal of Web Semantics*, 1(1): 75–80, 2004. 3.410

2.C Monographs, Reports, and Extension Publications

- R1. Aditya Kalyanpur, James Hendler, Bijan Parsia, **Jennifer Golbeck**. SMORE-semantic markup, ontology, and RDF editor. 2006.
- R2. **Jennifer Golbeck**. Computing and Applying Trust in Web-based Social Networks, Ph.D. Thesis, University of Maryland, College Park, 2005.
- R3. **Jennifer Golbeck**. Genetic Algorithms for Strategic Optimization. Master’s Thesis, University of Chicago, 2001.

2.D Book Reviews, Other Articles, and Notes

1. “Data Meets Design: a Review of Judith Donath’s The Social Machine”
Science, January 15, 2015
2. “The Live-Tweeted Prostitution Sting Was a Total Bust, and Not in a Good Way”
Slate, May 7, 2014
3. “What a Toilet Hoax Can Tell Us About the Future of Surveillance, on The Atlantic”
The Atlantic, April 29, 2014
4. “Google Tweaked How It Displays Search Results. Heres How to Change It Back”
Slate, March 14, 2014 Slate, January 1, 2014
5. “Beacon, ShopKick: Privacy Policies for location-tracking apps arent clear enough”
Slate January 28, 2014
6. “Facebook Cleansing: How to delete all of your account activity”
Slate, January 1, 2014
7. “Facebook self-censorship: What happens to the posts you don’t publish”
Slate, December 13, 2013
8. “Lovely Spam! Wonderful Spam! (book review of Spam A Shadow History of the Internet)”
Science: Vol. 340 no. 6137 p. 1171, 7 June 2013

2.E Talks, Abstracts, and Other Professional Papers Presented

2.E.i Invited Talks: Keynote (and Similar) Addresses

- T1. “Privacy, Social Context, and Social Media”
TEDxUMD
College Park, MD (May 3, 2014)
- T2. “Trust and Social Media”
AAAI 2013 Fall Symposium Series (Keynote)
Arlington, VA (November 15-17, 2013)
- T3. “Hidden Information Uncovered”
TEDxMidAtlantic
Washington, DC (October 25, 2013)
- T4. “User Profiling: a two-sided argument”
Conference on Social Computing and Its Applications (Keynote)
Karlsruhe, Germany (October 2, 2013)
- T5. “Analyzing the Social Web”
Baltimore Data Day, Federal Reserve Bank of Richmond (Keynote)
Baltimore, MD (July 11, 2013)
- T6. “Uncovering Hidden Social Information”
Data Science DC
Washington, DC (March 28, 2013)

- T7. “Pets on the Internet”
 TEDxGeorgetown
 Washington, DC (March 23, 2011)
- T8. “Tutorial on Using Social Trust for Recommender Systems”
 ACM Conference on Recommender Systems (RecSys '09)
 New York, New York (October 22, 2009)
- T9. “Computing with Social Trust: Web Algorithms, Social Networks, and Recommendations”
 Haverford College Distinguished Visitors Program, and Fantastic Lectures in Computer Science Series
 Haverford, Pennsylvania (March 17, 2009)
- T10. “Social Recommender Systems”
 SONIC and NICO Lecture Series, Northwestern University
 Evanston, Illinois (November 12, 2008)
- T11. “The Dynamics of Web-based Social Networks: Membership, Relationships, and Change”
 International Sunbelt Social Networking Conference (Sunbelt XXVIII)
 St. Pete, Florida (January 22, 2008)
- T12. “Social Networks, the Semantic Web, and the Future of Online Scientific Collaboration”
 FermiLab Colloquium Lecture
 Batavia, Illinois (October 25 2006)
- T13. “Trust and Web Policy Systems”
 Keynote talk at the Second International Workshop on the Value of Security through Collaboration
 Baltimore, Maryland (September 1, 2006)

2.E.ii Refereed conference proceedings

2.E.ii.1 Papers at Top-Tier Conferences ¹

- C1. Kan-Leung Cheng and I Zuckerman and D Nau, and **J Golbeck** ”Predicting Agents Behavior by Measuring their Social Preferences.” Proceedings on the European Conference on Artificial Intelligence. (2014).
- C2. Tammar Shrot, Avi Rosenfeld, **Jennifer Golbeck**, Sarit Kraus. Timing Interruptions to Improve User Performance. In *Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI'14)*. 10 pages. April 2014, Toronto, Canada 23%
- C3. Jennifer Golbeck, Eric Norris. Personality, Movie Preferences, and Recommendations. In Proceedings of the International Conference on Advances in Social Network Analysis and Mining, 4 pages. August 2013, Niagra Falls, Canada. 15%
- C4. Bert Huang, Angelika Kimmig and Lise Getoor and **Jennifer Golbeck**. Flexible Framework for Probabilistic Models of Social Trust. In *2013 Conference on Social Computing, Behavioral Modeling and Prediction*, 9 pages. April 2013, College Park, MD 31%

¹Conferences with highly-selective acceptance rates and/or top reputations in their field.

- C5. Carman Neustaedter and **Jennifer Golbeck**. Exploring pet video chat: the remote awareness and interaction needs of families with dogs and cats. In *Proceedings of Computer Supported Cooperative Work (CSCW'13)*, *in press*, 6 pages. February 2013, San Antonio, TX
- C6. **Jennifer Golbeck**. The Twitter Mute Button: A Web Filtering Challenge. In *Proceedings of the 30th International Conference on Human Factors in Computing Systems (CHI '12)*, pages 2755–2758. May 2012, Austin, TX. 23%
- C7. Irene Eleta and **Jennifer Golbeck**. A Study of Multilingual Social Tagging of Art Images: Cultural Bridges and Diversity. In *Proceedings of Computer Supported Cooperative Work (CSCW'12)*, pages 695–704. February 2012, Seattle, Washington 40%
- C8. Cheng, K.L., Zuckerman, I., Nau, D., and **Golbeck, J.** The Life Game: Cognitive Strategies for Repeated Stochastic Games. In *IEEE Third International Conference on and 2011 IEEE Third International Conference on Social Computing (SocialCom)*, pages 495–502. October 2011, Boston, Massachusetts. 10%
- C9. Nicholas Violi, **Jennifer Golbeck**, Kan-leung Cheng, and Ugur Kuter. Caretaker: A Social Game for Studying Trust Dynamics. In *IEEE Third International Conference on and 2011 IEEE Third International Conference on Social Computing (SocialCom)*, pages 451–456. October 2011, Boston, Massachusetts. 10%
- C10. **J. Golbeck**, C. Robles, M. Edmondson, and K. Turner. Predicting personality from twitter. In *IEEE Third International Conference on and 2011 IEEE Third International Conference on Social Computing (SocialCom)*, pages 149–156. October 2011, Boston, Massachusetts. 10%
- C11. K.L. Cheng, U. Kuter, and **J. Golbeck**. Coevolving strategies in social-elimination games. In *IEEE Third International Conference on and 2011 IEEE Third International Conference on Social Computing (SocialCom)*, pages 118–126. October 2011, Boston, Massachusetts. 10%
- C12. Thomas Dubois, **Jennifer Golbeck**, and Aravind Srinivasan. Network Clustering Approximation Algorithm Using One Pass Black Box Sampling. In *Third IEEE International Conference on Social Computing (SocialCom)*, pages 418–424. October 2011, Boston, Massachusetts. (Best Paper Award). 10%
- C13. Thomas Dubois, **Jennifer Golbeck**, and Aravind Srinivasan. Predicting Trust and Distrust in Social Networks. In *Third IEEE International Conference on Social Computing (SocialCom)*, pages 418–424. October 2011, Boston, Massachusetts. 10%
- C14. **Jennifer Golbeck** and Derek Hansen. Computing Political Preference Among Twitter Followers. In *Proceedings of the 29th International Conference on Human Factors in Computing Systems (CHI '11)*, pages 1105–1108. April 2011, Vancouver, Canada. 23%
- C15. Greg Walsh and **Jennifer Golbeck** Curator: a game with a purpose for collection recommendation. In *Proceedings of the 28th international Conference on Human Factors in Computing Systems (CHI '10)*, pages 2079–2082. April 2010, Atlanta, Georgia. 22%
- C16. Freire, M., Plaisant, C., Shneiderman, B., and **Golbeck, J.** ManyNets: an interface for multiple network analysis and visualization. In *Proceedings of the 28th international Conference on Human Factors in Computing Systems (CHI '10)*, pages 213–222. Atlanta, Georgia, USA, April 10–15, 2010. 22%

- C17. Ugur Kuter, **Jennifer Golbeck**^α. Semantic Web Service Composition in Social Environments. *Proceedings of the International Semantic Web Conference (ISWC09)*, pages 344–358. November 2009, Washington, D.C. (Best Paper Award) 20%
- C18. Thomas DuBois, **Jennifer Golbeck**, Aravind Srinivasan. Rigorous Probabilistic Trust Inference with applications to clustering. *Proceedings of the IEEE/WIC/ACM International Conference on Web Intelligence*, pages 655–658. September 2009, Milan Italy. 18%
- C19. Derek Hansen, **Jennifer Golbeck**. Mixing it Up: Recommending Collections of Items. *Proceedings of the Conference on Human Factors in Computing Systems (CHI'09)*, pages 1217–1226. April 2009, Boston, Massachusetts. 24.5%
- C20. **Jennifer Golbeck**, Matthew Rothstein. Linking Social Networks on the Web with FOAF: A Semantic Web Case Study. *Proceedings of the Twenty-Third National Conference on Artificial Intelligence (AAAI-08)*, pages 1138–1143. July 2008, Chicago, Illinois. 24%
- C21. Ugur Kuter and **Jennifer Golbeck**^α. SUNNY: A New Algorithm for Trust Inference in Social Networks, using Probabilistic Confidence Models. *Proceedings of the Twenty-Second National Conference on Artificial Intelligence (AAAI-07)*, pages 1377–1382. July 2007, Vancouver, Canada. 27%
- C22. Yarden Katz and **Jennifer Golbeck**. Social Network-based Trust in Prioritized Default Logic. *Proceedings of The Twenty-First National Conference on Artificial Intelligence (AAAI-06)*, pages 1345–1350. July 2006, Boston, Massachusetts. 30%
- C23. **Jennifer Golbeck**, James Hendler. Inferring reputation on the semantic web. *Proceedings of the 13th International World Wide Web Conference*, 8 pages. May 2004. New York, NY. 14.6%
- C24. **Jennifer Golbeck**, Michael Grove, Bijan Parsia, Aditya Kalyanpur, and James Hendler. New Tools for the Semantic Web, *Proceedings of the 13th International Conference on Knowledge Engineering and Knowledge Management (EKAW 2002)*, pages 392–400. October 2002, Siguenza, Spain. 34%

2.E.ii.2 Papers at Other Conferences

- C25. Cody Buntain and **Jennifer Golbeck**. "Identifying social roles in reddit using network structure." Proceedings of the companion publication of the 23rd international conference on World wide web companion. International World Wide Web Conferences Steering Committee, 2014.
- C26. Greg Walsh and **Jennifer Golbeck**. 2014. StepCity: a preliminary investigation of a personal informatics-based social game on behavior change. In CHI '14 Extended Abstracts on Human Factors in Computing Systems (CHI EA '14). ACM, New York, NY, USA, 2371-2376.
- C27. Sibel Adali and **Jennifer Golbeck**. Predicting personality with social behavior. In *2012 IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining*, 8 pages. August 2012, Istanbul, Turkey.
- C28. Buntain,Cody, **Jennifer Golbeck**, Dana Nau, and Sarit Kraus. Advice and Trust in Games of Choice. In *Tenth Annual Conference on Privacy, Security and Trust*, 2 pages. July 2012, Paris, France.

- C29. **Jennifer Golbeck**, Hal Warren, and Eva Winer. Making trusted attribute assertions online with the publish trust framework. In *Tenth Annual Conference on Privacy, Security and Trust*, 2 pages. July 2012, Paris, France.
- C30. David Yates and **Jennifer Golbeck**. Is facebook appropriate for the classroom? a comparison of student and faculty perspectives. In *Proceedings of the Euro-American Conference for Academic Disciplines and Creativity*, 27 pages. June 2012, Prague, Czech Republic. (Outstanding Research Presentation).
- C31. **Jennifer Golbeck**. STEM initiatives for improved communication skills in the zombie apocalypse. In *Proceedings of the 2012 ACM Conference on Human Factors in Computing Systems Extended Abstracts*, pages 1425–1426. May 2012, Austin, TX.
- C32. **Jennifer Golbeck** and Carman Neustaedter. Pet video chat: monitoring and interacting with dogs over distance. In *Proceedings of the 2012 ACM Conference on Human Factors in Computing Systems Extended Abstracts*, pages 1425–1426. May 2012, Austin, TX.
- C33. **Jennifer Golbeck**, Cristina Robles, Karen Turner Predicting Personality with Social Media. *Proceedings of alt.chi, ACM Conference on Human Factors in Computing (CHI 2011)*, pages 253–262. April 2011, Vancouver, Canada.
- C34. James Michaelis, **Jennifer Golbeck**, James Hendler Leveraging the Semantic Web to Enable Content Mashup For End Users. *Proceedings of HCI International 2011*, 10 pages. July 2011, Orlando, Florida.
- C35. **Jennifer Golbeck**, Kenneth Fleischmann. Trust in Social Q &A: The Impact of Text and Photo Cues of Expertise. *Proceedings of ASIST 2010*, pages 1–10. October 2010, Pittsburgh, Pennsylvania.
- C36. Klavans, Judith, **Jennifer Golbeck**. Integrating Multiple Computational Techniques for Improving Image Access: Applications to Digital Collections. *Proceedings of the 2010 Grace Hopper Conference*, 5 pages. September 2010, Atlanta, Georgia.
- C37. Dana Rotman, **Jennifer Golbeck**, Jennifer Preece. The Community is Where the Rapport Is: On Sense and Structure in the YouTube Community. *2009 Communities & Technologies Conference*, pages 41–50. June, 2009. University Park, Pennsylvania.
- C38. **Jennifer Golbeck**. On the Internet, Everybody Knows You’re a Dog: The Human-Pet Relationship in Online Social Networks. *ACM Conference on Human Factors in Computing Systems Extended Abstracts*, pages 4495-4500. April 2009, Boston, Massachusetts.
- C39. **Jennifer Golbeck**, Michael Wasser. SocialBrowsing: Integrating Social Networks into Web Browsing. *ACM Conference on Human Factors in Computing Systems Extended Abstracts*, pages 2381–2386. April 2007, San Jose, California.
- C40. Aaron Mannes, **Jennifer Golbeck**. Ontology Building: A Terrorism Specialist’s Perspective. *Proceedings of the IEEE Aerospace Conference*, 5 pages. March 2007, Big Sky, Montana.
- C41. Aaron Mannes, **Jennifer Golbeck**. Building a Semantic Web Portal for Counterterror Analysis. *Proceedings of the IEEE Aerospace Conference*, 5 pages. March 2007, Big Sky, Montana.
- C42. **Jennifer Golbeck**, Computing with Trust: Definition, Properties, and Algorithms. *Proceedings of International Conference on Security and Privacy in Communication Networks*, pages 1-7. August 2006, Baltimore, Maryland.

- C43. **Jennifer Golbeck**. Generating Predictive Movie Recommendations from Trust in Social Networks. *Proceedings of the Fourth International Conference on Trust Management*, pages 93–104. May 2006, Pisa, Italy.
- C44. **Jennifer Golbeck**, James Hendler. FilmTrust: Movie recommendations using trust in web-based social networks. *Proceedings of the IEEE Consumer Communications and Networking Conference*, pages 497–529. January 2006, Las Vegas, Nevada.
- C45. **Jennifer Golbeck**, Bernardo Cuenca Grau, Christian Halaschek-Wiener, Aditya Kalyanpur, Yarden Katz, Bijan Parsia, Andrew Schain, Evren Sirin, and James Hendler. Semantic web research trends and directions. *Proceedings of the First international Conference on Pattern Recognition and Machine Intelligence, PReMI. 2005*, pages 160–169. December 2005, Kolkata, India.
- C46. **Jennifer Golbeck**, James Hendler. Accuracy of Metrics for Inferring Trust and Reputation in Semantic Web-based Social Networks, *Proceedings of 14th International Conference on Knowledge Engineering and Knowledge Management*, pages 116–131. October 2004, Northamptonshire, UK.
- C47. **Jennifer Golbeck**, James Hendler. Reputation Network Analysis for Email Filtering. *Proceedings of the First Conference on Email and Anti-Spam*, pages 54–58. July 2004, MountableView, California.
- C48. **Jennifer Golbeck**, Bijan Parsia, James Hendler. Trust Networks on the Semantic Web, *Proceedings of Cooperative Information Agents*, pages 238–249. August 2003, Helsinki, Finland.
- C49. Mutton, Paul and **Jennifer Golbeck**. Visualization of Semantic Metadata and Ontologies, *Proceedings of Information Visualization*, pages 300–305. July 2003, London, UK.
- C50. Kalyanpur, Aditya and **Jennifer Golbeck** and Michael Grove and Jim Hendler. 2002. An RDF Editor and Portal for the Semantic Web, *Proceedings of Semantic Authoring, Annotation & Knowledge Markup (ECAI 2002)*, 4 pages. July 2002, Lyon, France.
- C51. **Jennifer Golbeck**. Evolving Strategies for the Prisoner’s Dilemma, *Advances in Intelligent Systems, Fuzzy Systems, and Evolutionary Computation*, pages 299–306. February 2002, Interlaken, Switzerland.

2.E.iii.3 Papers at Refereed Workshops

- W1. **Jennifer Golbeck**, Thameem Khan, Nilay Sanghavi and Nishita Thakker. Multiple Personalities on the Web: A Study of Shared Mboxes in FOAF. *Proceedings of the 2009 Workshop on Social Data on the Web*, 12 pages. October 2009, Washington, DC.
- W2. Thomas DuBois, **Jennifer Golbeck**, John Kleint, Aravind Srinivasan. Improving Recommendation Accuracy by Clustering Social Networks with Trust. *Proceedings of the ACM RecSys 2009 Workshop on Recommender Systems and the Social Web*, 8 pages. October 2009, New York, New York.
- W3. Audun Josang, **Jennifer Golbeck**, Challenges for robust trust and reputation systems. *Proceedings of the 5th International Workshop on Security and Trust Management*. 12 pages. August, 2009, Saint Malo, France.

- W4. Elena Zheleva, **Jennifer Golbeck**, Lise Getoor, Ugur Kuter. Using Friendship Ties and Family Circles for Link Prediction. *SNA-KDD Workshop on Social Network Mining and Analysis*, pages 97-113. August 2008, Las Vegas, Nevada.
- W5. V. Shiv Naga Prasad, Behjat Siddiquie, **Jennifer Golbeck**, and Larry S. Davis. Classifying Computer Generated Charts. *In Proceedings of the Workshop on Content Based Multimedia Indexing*, pages 85-92. June 2007, Bordeaux, France.
- W6. **Jennifer Golbeck**, Aaron Mannes. Using Trust and Provenance for Content Filtering on the Semantic Web. *Proceedings of the Workshop on Models of Trust on the Web*, 9 pages. May 2006, Edinburgh, UK.
- W7. Christian Halaschek-Wiener, **Jennifer Golbeck**, Bijan Parsia, Vladimir Kolovski, and Jim Hendler. Image browsing and natural language paraphrases of semantic web annotations. *First International Workshop on Semantic Web Annotations for Multimedia (SWAMM)*, 12 pages. May 2006, Edinburgh, UK.
- W8. Christian Halaschek-Wiener, **Jennifer Golbeck**, Andrew Schain, Michael Grove, Bijan Parsia, and Jim Hendler. Annotation and provenance tracking in semantic web photo libraries. *Proceedings of the International Provenance and Annotation Workshop*, pages 82–89. May 2006, Chicago, Illinois.
- W9. **Jennifer Golbeck**. Combining Provenance with Trust in Social Networks for Semantic Web Content Filtering. *Proceedings of the International Provenance and Annotation Workshop*, pages 101–108. May 2006, Chicago, Illinois.
- W10. Yarden Katz and **Jennifer Golbeck**. Nonmonotonic Reasoning with Web-Based Social Networks. *Proceedings of the Workshop on Reasoning on the Web*, pages 469–475. May 2006, Edinburgh, UK.
- W11. Aaron Mannes, **Jennifer Golbeck**, James Hendler. Semantic Web and Target-Centric Intelligence: Building Flexible Systems that Foster Collaboration. *Proceedings of Workshop Intelligent User Interfaces for Intelligence Analysis*, 4 pages. January 2006, Sydney, Australia.
- W12. **Jennifer Golbeck**. Semantic Web Interaction through Trust Network Recommender Systems. *End User Semantic Web Interaction Workshop*, pages 327–339. November 2005, Sanibel Island, Florida.
- W13. **Jennifer Golbeck**. Personalizing Applications through Integration of Inferred Trust Values in Semantic Web-Based Social Networks. *Semantic Network Analysis Workshop*, pages 1005–1018. November 2005, Sanibel Island, Florida.
- W14. Bijan Parsia, Taowei Wang, and **Jennifer Golbeck**. Visualizing Web Ontologies with Crop-Circles. *End User Semantic Web Interaction Workshop*, pages 1–8. November 2005, Sanibel Island, Florida.
- W15. Christian Halaschek-Wiener, Andrew Schain, **Jennifer Golbeck**, Michael Grove, Bijan Parsia, Jim Hendler. A flexible approach for managing digital images on the semantic web. *5th International Workshop on Knowledge Markup and Semantic Annotation*, pages 49–58. November 2005, Galway, Ireland.

- W16. Kalyanpur, Aditya, Nada Hashmi, **Jennifer Golbeck**, Bijan Parsia. Lifecycle of a Casual Web Ontology Development Process. *Proceedings of the Workshop on Application Design, Development and Implementation Issues in the Semantic Web*, 8 pages. May 2004, New York, New York.
- W17. **Jennifer Golbeck**, Paul Mutton, Semantic Web Interaction on Internet Relay Chat, *Proceedings of Interaction Design on the Semantic Web*, 5 pages. May 2004, New York, New York.

2.E.iii.4 Refereed Posters²

- P1. Irena Eleta and **Jennifer Golbeck**. Bridging Languages in Social Networks: How Multilingual Users of Twitter Connect Language Communities?, *ASIS&T 2012 Annual Meeting*, October 2012, Baltimore, Maryland.
- P2. Bert Huang and Angelika Kimmig and Lise Getoor and **Jennifer Golbeck**. Probabilistic Soft Logic for Trust Analysis in Social Networks, *International Workshop on Statistical Relational AI*. August 2012, Catalina Island, CA.
- P3. Cristina Robles, **Jennifer Golbeck**. Facebook Relationships in the Workplace. *Proceedings of CompleNet 2012*. March 2012, Marathon, Florida.
- P4. Judith L. Klavans, Susan Chun, **Jennifer Golbeck**, Dagobert Soergel, Robert Stein, Ed Bachtta, Rebecca LaPlante, Kate Mayo, John Kleint. Language and Image: T3 = Text, Tags, and Trust. *2009 Digital Humanities Conference*. July 2009, College Park, Maryland.
- P5. **Jennifer Golbeck**, Jeanne Kramer-Smyth. Visualizing Archival Collections with ArchivesZ. *Proceedings of the 2009 Digital Humanities Conference*, July 2009, College Park, Maryland.
- P6. Praveen Paruchuri, Preetam Maloor, Bob Pokorny, Aaron Mannes, **Jennifer Golbeck**. Cultural Modeling in a Game-Theoretic Framework, *AAAI Fall Symposium on Adaptive Agents in Cultural Contexts*. November 2008, Washington, DC.
- P7. Wu, P. F., Qu, Y., Fleischmann, K., **Golbeck, J.**, Jaeger, P., Preece, J., & Shneiderman, B. Designing a Community-Based Emergency Communication System: Requirements and Implications. *Annual Meeting of the American Society for Information Science and Technology (ASIS&T 2008)*. October 2008, Columbus, OH.
- P8. **Jennifer Golbeck**, FilmTrust: Movie Recommendations from Semantic Web-based Social Networks. *IEEE Consumer Communications and Networking Conference*. January 2006, Las Vegas, Nevada.
- P9. **Jennifer Golbeck**, FilmTrust: Movie Recommendations from Semantic Web-based Social Networks. *International Semantic Web Conference*. November 2005, Galway, Ireland
- P10. Halaschek-Wiener, Christian , Jennifer Golbeck, Andrew Schain, Michael Grove, Bijan Parsia, Jim Hendler Photostuff-an image annotation tool for the semantic web. *Proceedings of the Poster Track, 4th International Semantic Web Conference*. November 2005, Galway, Ireland.

² Peer-reviewed poster presentations, typically accompanied by short descriptions in associated proceedings.

- P11. Pin Xu, Lyubov Remennik, N. Rao Thotakura, **Jennifer Golbeck**, Liju Fan. Prototype development of an immunology ontology that integrates multiple biomedical ontologies. *7th International Protege Conference*. July 2004, Washington, DC.
- P12. **Jennifer Golbeck**, Bijan Parsia, James Hendler. Trust Networks on the Semantic Web. *Twelfth International World Wide Web Conference*, May 2003, Budapest, Hungary.
- P13. **Jennifer Golbeck**, Ron Alford, Ross Baker, Mike Grove, Jim Hendler, Aditya Kalyanpur, Amy Loomis, Ron Reck. Semantic Web Tools from MINDSWAP. *1st Annual International Semantic Web Conference*, June 2002, Sardinia, Italy.

2.I Fellowships, Prizes, and Awards

- 2015 University of Maryland Research Communication Award
- 2014 University System of Maryland Board of Regents Mentoring Award
- TED Most Powerful Talks of 2014
- 2011 IEEE Conference on Social Computing Best Paper Award
- 2009 International Semantic Web Conference Best Paper Award
- Research Fellow, Web Science Research Initiative (2008 – present)
- IEEE Intelligent Systems Ten to Watch³ (May 2006)
- 2005 DARPA IPTO Young Investigator (May 2005)

2.J Editorships, Editorial Boards, and Reviewing Activities for Journals and Other Learned Publications

2.J.i Editorial Boards

- Editorial Board, Data Science
- Editorial Committee, Journal of Web Semantics – Special Issue “Exploring New Interaction Designs Made Possible by the Semantic Web”
- Guest Editor, Security & Privacy Magazine, Special Issue on “Security in Social Networks”

2.J.ii Conference Chair Positions

- Program Co-chair, **Recsys 2015**: Conference on Recommender Systems
- Fellowships Chair, **ISWC 2012**: 11th International Semantic Web Conference
- Fellowships Chair, **ISWC 2011**: 10th International Semantic Web Conference
- Tutorials Co-chair, Program Committee Vice Chair, **ISWC 2009**: 8th International Semantic Web Conference
- Co-organizer, **SWUI 2009**: Semantic Web User Interactions: Exploring HCI Challenges Workshop at ISWC09.
- Co-organizer, Workshop on Social Technology for Biodiversity: Motivation, Credibility & Community, 2008
- Co-organizer, **SWUI 2008**: Semantic Web User Interactions: Exploring HCI Challenges Workshop at CHI’08
- Semantic Web Challenge Co-chair, **ISWC 2007**: 6th International Semantic Web Conference
- Semantic Web Challenge Co-chair, **ASWC 2007**: 2nd Asian Semantic Web Conference

³list of top ten young AI researchers

- Co-organizer, Helping Users Make Sense of Social Networks: A Workshop, 2007
- Proceedings Chair, **ISWC 2006**: 5th International Semantic Web Conference
- Co-organizer, Workshop on Trust, Security, and Reputation on the Semantic Web, 2006
- Organizer, Developers Day Trust on the Web Track, **WWW 2005**: 13th International World Wide Web Conference

2.J.iii Reviewing: Journals

- ACM Computing Surveys: 2012 (1)
- ACM Transactions on Intelligent Systems: 2012 (2)
- ACM Transactions on Internet Technology: 2009 (1)
- ACM Transactions on Multimedia Computing, Communications, and Applications: 2009 (1)
- ACM Transactions on the Web: 2008 (2), 2009(1), 2012 (1)
- Behaviour and Information Technology: 2008 (1)
- Artificial Intelligence: 2008 (1)
- European Journal of Operational Research: 2007 (1)
- Foundations and Trends in Information Retrieval: 2015 (1)
- Foundations and Trends in Web Science: 2013 (1),
- International Journal of Human Computer Studies: 2008 (1)
- International Journal on Semantic Web and Information Systems: 2007 (1)
- Journal of the American Society for Information Science and Technology: 2010 (1), 2011 (1), 2012 (1)
- Journal of Web Semantics: 2006 (1), 2007 (3), 2008 (1), 2012 (2)
- Policy & Internet: 2012 (1)

2.J.iv Reviewing: Top-Tier Conferences

- **AAAI**: AAAI Conference on Artificial Intelligence, Senior Program Committee 2011, 2012; Program Committee 2006, 2007, 2008, 2009, 2010
- **RecSys**: ACM Conference on Recommender Systems, Senior Program Committee 2010, 2011, 2012
- **CSCW**: Computer Supported Cooperative Work, Program Committee 2008, 2012, 2013
- **CHI**: ACM Conference on Human Factors in Computing, Program Committee 2009, 2010, 2011, 2012
- **IJCAI**, International Joint Conference on Artificial Intelligence, Program Committee 2009
- **WWW**: International World Wide Web Conference, Program Committee 2006, 2007, 2008, 2009
- **ISWC**: International Semantic Web Conference, Senior Program Committee 2009, 2010, 2011, 2012, Program Committee 2008
- **KDD**: Conference on Knowledge Discovery and Data Mining, Senior Program Committee 2010
- **GROUP**: Conference on Supporting Group Work, Program Committee 2009
- **IJCAI**: International Joint Conferences on Artificial Intelligence, Program Committee 2009

2.J.v Reviewing: Other Venues

- **IFIPTM**: International Conference on Trust Management, Program Committee 2009, 2010, 2011, 2012
- **IEA-AIE**: Engineering Knowledge and Semantic Systems, Program Committee 2011

- **SSW**: AAAI Symposium on the Social Semantic Web, Program Committee: 2009
- **WebSci**: Web Science Conference: Society On-Line International Semantic Web Conference, Program Committee 2008
- **BlogTalk**: International Conference on Social Software, Program Committee 2008
- **PST**: Conference on Privacy, Security and Trust, Program Committee 2008
- **SAC**: ACM Symposium on Applied Computing, Program Committee 2008, 2005
- **CoSoSo**: International Conference on Social Software, Program Committee 2008
- **IUI**: Intelligent User Interfaces Conference, Program Committee 2008
- **CEAS**: Conference on Email and Anti-Spam, Program Committee 2007
- **CIKM**: onference on Information and Knowledge Management, Program Committee 2007
- **CAT**: Context Awareness and Trust, Program Committee 2007
- **Policy**: IEEE Policy, Program Committee 2007
- **SWC**: Semantic Web Challenge, Program Committee 2007
- **SCCSW**: Social and Collaborative Construction of Structured Knowledge Workshop, Program Committee 2007
- **SWCKA**: AAAI Fall Symposium on Semantic Web for Collaborative Knowledge Acquisition, Program Committee 2006
- **EKAW**: International Conference on Knowledge Engineering and Knowledge Management, Program Committee 2006
- **SECOVAL**: The Value of Security through Collaboration Workshop, Program Committee 2005, 2006.
- **SWUI**: Semantic Web User Interaction Workshop, Program Committee 2006
- **OWLED**: OWL Experiences and Directions, Program Committee 2006
- **SPTWS**: Workshop on Security, Privacy, and Trust in Web Services, Program Committee 2006
- **MTW**: Models of Trust Workshop, Program Committee 2006
- **OWLED**: OWL: Experiences and Directions Workshop, Program Committee 2005
- **FOAF**: Workshop on Friend of a Friend, Social Networking, and the Semantic Web, Program Committee 2004
- **SWUI**: First International Workshop on Interaction Design and the Semantic Web, Program Committee 2004
- **VIKE**: Visualizing Information in Knowledge Engineering (VIKE), Program Committee 2003

2.K Other

2.K.i External Talks (see section 2.E.i for keynote and similar talks)

- “Opportunities and risks of discovering personality traits from social media”
CHI 2014
Toronto, Canada (May 29, 2014)
- “Predicting User Attributes in Social Media ”
Society 2013
State College, PA (May 9, 2013)
- “Generational Computing and Social Media”
Department of Defense Deep Dive on Obesity
Portsmouth, VA (August 19, 2012)
- “Information Sharing in Social Networks”
FBI Lookout Group Meeting

- Dallas, TX (August 14, 2012)
- “Social Networks and HCI Research”
National Reconnaissance Office
Chantilly, VA (March 15, 2012)
- “Information Sharing in Social Networks”
Potomac Valley Chapter (PVC) of the American Society of Information Science and Technology
Washington, DC (April 10, 2012)
- “Computing Trust and Personality in Social Networks”
Aberdeen Proving Ground Network Science Meeting
Aberdeen, MD (March 5, 2012)
- “Managing Content With Trust”
Professional & Scholarly Publishers 2012 Annual Conference
Washington, DC (February 2, 2012)
- “Information Sharing in Social Networks”
FBI Lookout Group Meeting
Dallas, TX (January 9, 2012)
- “From Open Data to Open Worlds: The Power of the Semantic Web” World Bank Information Management Technology Group Forum
Washington, DC (December 8, 2011)
- “Information Sharing in Social Networks”
FBI Headquarters – Counterintelligence Division All-hands Meeting
Washington, DC (November 17, 2011)
- “Predicting Personality from Social Media”
FBI Counterintelligence Behavioral Analysis Unit
Quantico, VA (November 1, 2011)
- “Computing with Social Trust”
Army Research Lab Seminar Series
Adelphi, MD (December 8, 2010)
- “Computing with Social Trust”
Aberdeen Proving Ground CTA Seminar
Aberdeen, MD (November 16, 2010)
- “Personality Traits and Facebook Profiles”
Social and Cognitive Network Academic Research Center Seminar Series
Rensselaer Polytechnic Institute, Troy, NY (April 18, 2010)
- “Social Recommender Systems on the Semantic Web”
National Archives Semantic Web Myth and Fact
Washington, DC (November 17, 2009)
- “Social Software in Digital Libraries and Archives”
Online Computer Library Center (OCLC)
Arlington, VA (November 5, 2009)
- “Recommender Systems, Social Trust, and Television Applications”
StreamSage (a division of Comcast)
Washington, DC (September 9, 2009)
- “Social Networks on the Semantic Web”
Microsoft Research Faculty Summit
Redmond, Washington (July 28, 2008)
- “Understanding Social Networks”

- The 25th Annual Human-Computer Interaction Lab Symposium
College Park, Maryland (May 29, 2008)
- “Social Networks and Intelligent Systems: Using Relationships for Information Access”
University of Illinois Urbana-Champaign HCI Seminar
Urbana, Illinois (February 29, 2008)
 - “Social Networks and the Semantic Web”
Invited talk at Rensselaer Polytechnic Institute
Troy, New York (February 4, 2008)
 - “Recommending Movies with Social Networks”
StreamSage / Comcast
Washington, DC (November 2007)
 - “Social Information Access: Connecting Distributed Information and People on the Web”
Presentations with similar titles and content given in the following venues
 - Northeastern University College of Computer and Information Science
Boston, Massachusetts (February 2007)
 - University of Maryland College of Information Studies
College Park, Maryland (February 2007)
 - Drexel College of Information Science and Technology
Philadelphia, Pennsylvania (April 2007)
 - “Analysis and Applications of Web-based Social Networks”
University of Illinois at Urbana-Champaign Age of Networks: Social, Cultural, and Technological Connections Speaker Series
Urbana, Illinois (January 22 2007)
 - “Provenance Challenge: A Semantic Web Approach”
Global Grid Forum – GGF18/GridWorld
Washington, DC (September 13 2006)
 - “The Other Kind of Networking: Social Networks on the Web”
Duke University (March 2006)
 - Web-based Social Network Analysis for Socially Intelligent Applications
University of Illinois at Chicago (November 2005)
 - “Trust in Social Networks”
National Security Agency Knowledge Discovery Research Colloquium
Ft. Meade, Maryland (August 2005)
 - “Connections, Computation, and Cinema”
Presentations with similar titles and content given in the following venues
 - University of Georgia, March 2005.
 - MIT Media Lab, March 2005.
 - “Inferring Trust in Web-based Social Networks”
National Security Agency
Ft. Meade, Maryland (February 2005)
 - “Trust on the Semantic Web”
Thirteenth Annual World Wide Web Conference Developers Day
New York, New York (May 2004)
 - “The Semantic Web as a Complex System”
International Conference on Complex Systems
Boston, Massachusetts (May 2004)

- “Metadata Visualization Challenges”
NASA Goddard Semantic Web Interest Group
Greenbelt, Maryland (November 2003)
- “Semantic Web: Structure and Modeling”
Half-day workshop at the Howard University
Washington, DC (June 2003)
- “Putting Time into Cognitive Systems: From Real-Time Operating Systems to Information Dynamics”
Virtual Worlds and Simulation Conference
Orlando, Florida (January 2003)
- “Tools on the Semantic Web”
Half-day workshop at the Howard University
Washington, DC (November 2002)
- “Small Worlds on the Semantic Web”
Science on the Semantic Web (SWS) Workshop
Boston, Massachusetts (October 2002)
- “Evolving Strategies for the Prisoners Dilemma”
13th International Conference on Game Theory
Stony Brook, New York (July 2002)
- “Semantic Web Do-It-Yourself: Tools for Generating RDF Content”
NASA Goddard Semantic Web Interest Group
Greenbelt, Maryland (April 2002)

2.K.ii Internal Talks

- “Video Chat for Pets”
HCIL Symposium
College Park, Maryland (May 22, 2012)
- “Social Network Strategies for Surviving the Zombie Apocalypse”
HCIL Symposium
College Park, Maryland (May 22, 2012)
- “The Twitter Mute Button”
HCIL Symposium
College Park, Maryland (May 22, 2012)
- “Understanding Users and Relationships in Social Networks”
MURI Virtual Brown Bag
College Park, Maryland (April 9, 2012)
- “Computing Trust in Social Networks”
Guest Lecture to PSY228Q: The psychology of social networking and social computing
College Park, Maryland (April 2, 2012)
- “Social Computing 2”
Guest Lecture to CMSC434: Intro to HCI
College Park, Maryland (November 30, 2011)
- “Social Computing 1”
Guest Lecture to CMSC434: Intro to HCI
College Park, Maryland (September 21, 2011)
- “Understanding Users and Relationships in Social Networks”

HCIL Symposium

College Park, Maryland (May 25, 2011)

- “Trust, Ties, and Information Diffusion in Social Networks”
Guest Lecture in INFM289j: Social Media Campaigns for the WellBeing of Humankind
College Park, Maryland (November 22, 2010)
- “Recommender Systems, Social Networks, and Applications”
Guest lecture to CPSP218J: Media, Self, and Society
College Park, Maryland (September 20, 2010)
- “Twitter Use by the US Congress”

HCIL Symposium

College Park, Maryland (May 26, 2010)

- “Recommender Systems, Social Networks, and Applications”
Guest lecture to CPSP218J: Media, Self, and Society
College Park, Maryland (September 8, 2009)
- “Designing Systems to Help Find Experts”

iSchool Colloquium

College Park, Maryland (September 15, 2008)

- “Social Networks on the Web: Challenges and Opportunities”
Smith School of Business, University of Maryland
College Park, Maryland (March 14, 2008)
- “Social Trust for Information Access”
Center for Information Policy and E-Government (CIPEG) Policy Seminar Series
College Park, Maryland (February 25, 2008)
- “Social information access -using social networks to sort, filter, and aggregate”
Human-Computer Interaction Lab (HCIL) Brown Bag Lunch
College Park, Maryland (November 8, 2008)
- “Inferring Trust in Social Networks for Information Presentation”
Computational Linguistics and Information Processing (CLIP) Lab Colloquium
College Park, Maryland (October 3, 2007)

2.K.iii Panels⁴

- Panelist, Social Media, NewsVision (digital media conference), March 30, 2009, Washington, DC (invited)
- Panelist, Data Fusion and Data Enrichment Panel, Director of National Intelligence Open Source Conference, July 2007, Washington, DC (invited)

2.K.iv Media Mentions

Online and Print Media⁵

- Huffington Post: The Fall of Facebook - and What’s Next (June 25, 2014)
- Understanding User Generated Tags for Digital Collections: An Interview with Jennifer Golbeck* (May 1, 2013)
- Associated Press: What you ‘like’ on Facebook can be revealing (March 11, 2013)†
- Politico: ‘Weinergate’ a cautionary tale? (May 31, 2011)†
- Daily Caller: Facebook can serve as personality test (May 23, 2011)

⁴ Appearances on panels, not accompanied by papers. Refereed or invited as noted.

⁵†Denotes cases where I was interviewed.

- ABC News: Facebook can serve as personality test (May 13, 2011)
- Jezebel: Your Facebook Is The New “Personality Test” (May 13, 2011)
- Time: Put Your Best Face Forward: Facebook Deemed an Accurate Personality Test for Employers (May 10, 2011)
- ABC Online: Facebook can serve as personality test (May 9, 2011)
- Discovery News: Facebook can serve as personality test (May 9, 2011)
- Seattle Post Intelligencer: What Facebook tells your boss about your personality (May 9, 2011)
- Hindustan Times: Facebooks employee personality test (May 10, 2011)
- New Scientist: Why Facebook friends are worth keeping (July 15, 2010)†
- Corp Comms Magazine: Politicians Tweet Sweet Nothings (September 22, 2009)
- Sacramento Bee: Tweet-tweet goes Schwarzenegger, a big Twitter user (September 22, 2009)†
- Stars & Stripes (U.S. Military Newspaper)
 - Japan Edition (September 22, 2009)†
 - Mideast Edition (September 22, 2009)†
 - Korea Edition (September 21, 2009)†
- USTINET News: Study: Congress Tweets Lack Citizen Talk (September 21, 2009)
- United Press International: Study: Congress Tweets lack citizen talk (September 21, 2009)†
- Baltimore Sun: Congressional Twitter mostly twaddle (September 21, 2009)†
- San Diego Union-Tribune: Politicians on Twitter have a lot to say about themselves (September 20, 2009)†
- Lawrence Journal World & News: Members of Congress tweet their own horns (September 20, 2009)†
- The Telegraph (Calcutta, India): Blowing tweet horns (September 20, 2009)†
- The News Journal (Wilmington, DE): For Twitter-happy politicians, the service is all about them (September 20, 2009)†
- Honolulu Advertiser: Politicians Tweets self-promotional (September 20, 2009)†
- Huffington Post: Politicians On Twitter: Tweets By Lawmakers Boastful Or Boring: Study (September 19, 2009)†
- Hawaii Reporter: Politicians Tweets Are Mostly Self-Promotional, Researchers Say (September 19, 2009)†
- Austin American Statesman: Lawmakers use Twitter for self-promotion, study finds (September 19, 2009)†
- The Arizona Republic: Surprise! Twitter from D.C. about self-promotion (September 18, 2009)†
- St. Petersburg Times: Times Wires (September 18, 2009)†
- The Hill: Lawmakers Tweets Largely Self-Promotional (September 18, 2009)†
- The Washington Post: Politicians Tweets Are Mostly Self-Promotional, Researchers Say (September 18, 2009)†
- Politico: Study: Congress Needs Twitter Help (September 16, 2009)†
- Kansas City Star: Study: Congress all a Twitter (September 15, 2009)†
- Ars Technica: Who do you trust 2.0: Building better preference predictions (September 21, 2008)†
- Delmarva Daily Times: ALL ABOUT ME: ‘25 Things’ becomes one of Facebook’s biggest fads. (February 27, 2008)†
- WEYI NBC25: Facebook backs down on change (February 18, 2009)†
- Wired.com: Obama Supporters Act to Clear FUD. (November 12, 2007)†

- Physics World: Talking Physics in the Social Web (January 2007)
- Salon.com: You are who you know (June 15, 2004)†

Podcasts, Radio, and TV

- , NPR, The Kojo Nnamdi Show, guest host (January 2014-present)
- NPR, To The Point (January 3, 2014)
- NPR, The Kojo Nnamdi Show, interview on “From :) to GIFS: Expressing ourselves with images online” (March 21, 2013)
- Wisconsin Public Radio, The Joy Cardin Show, interview on “What your Facebook Likes say about you” (March 21, 2013)
- NPR, interview on social media and the Olympics (August 1, 2012)
- NPR, The Kojo Nnamdi Show, interview on “The Future Of Neighborhood Communication” (July 31, 2012)
- NPR, The Kojo Nnamdi Show, interview on “Frictionless Web: Social Readers And Seamless Sharing” (June 12, 2012)
- NPR, The Kojo Nnamdi Show, interview on “The Interest in Pinterest” (February 28, 2012)
- NPR, The Kojo Nnamdi Show, interview on “The New Sharing Economy” (October 31, 2011)
- NPR, The Kojo Nnamdi Show, interview on “Social Networking Grows Up” (March 24, 2011)
- NPR, The Kojo Nnamdi Show, interview on photos and social media (February 15, 2011)
- NPR, The Animal House, interview on social networks for pets (January 15, 2011)
- BBC World Service Newshour, interview on Twitter use by PMs (October 21, 2009)
- WHIO TV, interview on the use of Twitter by Congress (October 3, 2009)
- KCSN Radio, interview on the use of Twitter by Congress (September 21, 2009)
- WTOP Radio, interview on the use of Twitter by Congress (September 15, 2009)
- NBC 4, TV interview on Facebook data sharing policy (February 17, 2009)
- Science Podcast, interview on trust in social networks (September 18, 2008)
- NBC 4, TV interview on internet predators (February 21, 2008)
- The Diane Rehm Show (National Public Radio), panelist for discussion of Social Networks (July 10, 2006)

3 Teaching, Mentoring, and Advising

3.A Courses Taught in the Last Five Years

- INST 775: HCI Capstone Prep
 - Fall 2013 (enrollment 12)
- INST 631 / LBSC795: Fundamentals of HCI
 - Fall 2012 (enrollment 13)
 - Fall 2011 (enrollment 15)
- INST 633 / LBSC708L: Analyzing Social Networks and Social Media
 - Spring 2011 (enrollment 22)
 - Spring 2013 (enrollment 18)
 - Summer 2013 (enrollment 19)
 - Winter 2013 (enrollment 13)
 - Summer 2015 enrollment 20

- INFM289I: Social Networks: Technology and Society
 - Spring 2010 (enrollment 67)
 - Fall 2010 (enrollment 64)
 - Spring 2012 (enrollment 75)
- LBSC 690: Information Technology
 - Summer 2012 (enrollment 18)
 - Spring 2012 (enrollment 18)
 - Winter 2011 (enrollment 22)
 - Winter 2010 (enrollment 16)
 - Spring 2009 (enrollment 26)
 - Fall 2007 (enrollment 25)
- LBSC 743: Development of Internet Applications
 - Spring 2010 (enrollment 32)
 - Fall 2009 (enrollment 27)
 - Spring 2009 (enrollment 36)
- LBSC 888: Doctoral Seminar
 - Fall 2008 (enrollment 7)
 - Spring 2014 (enrollment 7)
- INFM 220: Information Users in Social Context
 - Spring 2008 (enrollment 22)
- CMSC 498N: Small Worlds, Social Networks, and Web Algorithms
 - Spring 2007 (enrollment 14)

3.B Course or Curriculum Development

- Fall 2012: Development of HCI Masters capstone classes, INST 775 and 776
- Fall 2011: Redevelopment of LBSC795 / INST631 for HCI Masters program
- Spring 2010: First offering of new course for undergraduate iSeries, INFM289I: Social Networks, Technology, and Society
- Winter 2010. Developed online version of LBSC690: Information Technology
- Spring 2009. First offering of new course. INFM 743: Development of Internet Applications
- Spring 2009. Significant course revision. LBSC 690: Information Technology
- Spring 2008. First offering of new course. INFM 220: Information Users in Social Context
- Fall 2007. Development of new course LBSC 888: Doctoral Seminar (with Allison Druin)
- Spring 2007. First offering of new course. CMSC 498N: Small Worlds, Social Networks, and Web Algorithms

3.C Textbooks, Manuals, Notes, Software, Web pages and Other Contributions to Teaching

3.C.i Textbooks

- **Jennifer Golbeck**, Social Network and Social Media Analysis. Burlington, MA: Morgan Kaufmann, 2013.

3.C.ii Other Contributions to Teaching

- Developed Web-accessible course material (slides, exercises, assignments, sample exams, etc.) for LBSC 690. Adapted from material by Jimmy Lin and Allison Druin.
- Developed Web-accessible course material for INFM 743.
- Developed Web-accessible course material for INFM 220.
- Built three two-week modules (mini-courses) for LBSC 888.
- Developed and implemented online module system for LBSC 888, where faculty can build and submit two-week modules for the doctoral seminar.
- Developed Web-accessible course material for CMSC 498N.

3.E Advising: Other Than Research Direction

3.E.i Undergraduate

- Anthony Rogers, Individual Studies Program, Fall 2007 – present
- Ben Falk, Individual Studies Program, Spring 2008 – present
- Ryan McCormick, Individual Studies Program, Spring 2008 – present

3.E.ii Master's

- Spring 2009: 13 advisees
- Fall 2008: 13 advisees

3.F Advising: Research Direction

3.F.i Undergraduate

- Danny Laurence
Spring 2012 – present
Research topic: Computing trust in social networks
- Elaine Wang
Spring 2012 – present
Research topic: Multilingual Use of Twitter
- Vincent Kuyatt (Undergraduate Student, Computer Science)
Spring 2011
Research Topic: Real time strategy games for social strategy analysis
- Michon Edmonson (Undergraduate Student, Computer Science)
Spring 2011 – present
Research Topic: Computing personality and trust
- Wendy Mock (Undergraduate Student, Computer Science)
Spring 2011 – present
Research Topic: Social tagging of images
- Eric Norris (Undergraduate Student, Computer Science)
Summer 2010 – present
Research Topic: processing social network data

- Nima Rad (Undergraduate Student, Computer Science)
Summer 2010 – Winter 2011
Research Topic: Games for understanding social strategies
- Karen Turner (Undergraduate Student, Psychology)
Spring 2010 – Fall 2010
Research topic: Use of Facebook
- Anthony Rogers (Undergraduate Student, Individual Studies)
Spring 2008 – present
Research topic: Social networks on the web
- Stuart Moore (Undergraduate Student)
Spring 2008, In the context of INFM 220
Research topic: Expert search
- Joanne Kim (Undergraduate Student)
Spring 2008, In the context of INFM 220
Research topic: Expert search
- Mariya Filippova (Undergraduate Student, Computer Science)
Fall 2007 – Spring 2008
Research topic: Social Applications in Facebook
- Greg Phillips (Undergraduate Student, Computer Science)
Spring 2008, In the context of INFM 220
Research topic: Sentiment analysis in online communities
- Matthew Rothstein (Undergraduate Student, Computer Science)
Spring 2007 – Summer 2008
Research topic: Merging social networks on the Semantic Web with FOAF
- Michael Wasser (Undergraduate Student, Computer Science)
Fall 2005 – Spring 2007
Research topic: Adding social context to web pages

3.F.ii Master's

Masters Thesis Committees

- Member, Thesis Committee
Kelly Hoffman (MLS student, the iSchool): Fall 2007 – Spring 2008
- Member, Thesis Committee
Chris Zamerelli (MLS student, the iSchool): Fall 2007 – Spring 2008
- Member, Thesis Committee
D. Adam Anderson (MLS student, the iSchool): Fall 2007 – Spring 2008

Other

- Zahra Ashktorab (HCIM Student, the iSchool)
Fall 2011 – present
Research topic; Social Recommender Systems
- Beth Emmerling (PhD student, the iSchool)
Spring 2010 – Fall 2011
Research topic: Image tagging
- Cristina Robles (MLS student, the iSchool)
Spring 2010 – Spring 2011
Research topic: Use of Facebook
- Alon Motro (MIM student, the iSchool)
Spring 2009 – Spring 2012
Research topic: Computing trust in social networks
- Jeanne Kramer-Smyth (MLS student, the iSchool)
Fall 2008 – Spring 2009
In the context of NEH Digital Humanities Startup Grant
Research Topic: Development of ArchivesZ visualization tool for archival collections
- Rishabh Vyas (MIM student, the iSchool)
Fall 2008 – Spring 2009
In the context of a Graduate Research Assistantship (GRA)
Research Topic: expert search through document indexing
- Manasee Mahajan (MIM student, the iSchool)
Fall 2007 – Fall 2008
Research Topic: expert search through document indexing

3.F.iii Doctoral

As Advisor/Co-Advisor

- Advisor, Zahra Ashktorab (Ph.D. Student, iSchool)
- Advisor, Cody Buntain (Ph.D. Student, Computer Science)
- Advisor, Irene Eleta (Ph.D. Student, iSchool)
- Advisor, Jes Koepfler (Ph.D. Student, iSchool)
- Advisor, John Kleint (Ph.D. Student, Computer Science)
- Co-Advisor with Don Perlis, Hamid Shahri (Ph.D Student, Computer Science)
Graduated Spring 2011
First permanent position: Technology Researcher at the Mayo Clinic
- Co-Advisor with Jim Hendler, Vladimir Kolovski (Ph.D. Student, Computer Science)
Graduated May 2008.
First permanent position: Research Scientist, Oracle (Nashua, NH)
- Co-Advisor with Jim Hendler, Christian Halaschek-Weiner (Ph.D. Student, Computer Science)
Graduated December 2007.
First permanent position: Chief Technology Officer of Clados Management LLC.

Other Dissertation Committees

- Member, dissertation committee
Ed Condon (Ph.D. Student, Computer Engineering), Fall 2012–present
- Member, dissertation committee
Jared Sylvester (Ph.D. Student, Computer Science, Fall 2014
- Member, dissertation committee
Megan Monroe (Ph.D. Student, Computer Science), Fall 2013–Spring 2014
- Member, dissertation committee
Kan Leung Cheng (Ph.D. Student, Computer Science), Fall 2010–Summer 2013
- Member, dissertation committee
Greg Walsh (Ph.D. Student, the iSchool), Fall 2010–Summer 2012
- Member, dissertation committee
Bo Han (Ph.D. Student, Computer Science), Summer 2012
- Member, dissertation committee
Tom Dubois (Ph.D. Student, Computer Science), Fall 2010 – Spring 2011
- Member, dissertation committee
Elena Zheleva (Ph.D. Student, Computer Science), Fall 2008 – Spring 2011
- Member, dissertation committee
Hamid Shahri (Ph.D. Student, Computer Science): Fall 2009 – Spring 2011
- Member, dissertation committee
Chuk-Yang Seng (Ph.D. Student, Computer Science): Fall 2008 – Summer 2009
- Member, dissertation committee
Adam Perer (Ph.D. Student, Computer Science): Fall 2007 – Spring 2008

Other⁶

- Dana Rotman (Ph.D. Student, the iSchool): Fall 2009 – present
Research Topic: Community structure in YouTube
- Tom DuBois (Ph.D. student, Computer Science): Spring 2009 – Spring 2011
Research Topic: Computing trust in social networks
- Justin Grimes (Ph.D. Student, the iSchool): Spring 2009
Research Topic: Twitter Usage in Congress
- Elena Zheleva (Ph.D. Student, Computer Science): Fall 2008 – Spring 2011
Research Topic: Link prediction in social networks
- Christina Pikas (Ph.D. Student, the iSchool): Spring 2008
Research Topic: Social networks in science blogs
- Philip Fei Wu (Ph.D. Student, the iSchool), Fall 2007 – Spring 2008
Research Topic: Community Response Grids

⁶ Students with whom I have had significant research interaction on specific projects, in a capacity other than their advisor/co-advisor.

4 Service

4.A Professional

4.A.i Offices and committee memberships held in professional organizations⁷

- World Wide Web Consortium Semantic Web Best Practices Working Group, March 2004 – October 2004

4.A.ii Reviewing activities for agencies

- Review panelist, NASA Postdoctoral Fellows program Summer 2011
- Review panelist, National Science Foundation (NSF), Directorate for Computer and Information Science and Engineering (CISE), Spring 2011
- Review panelist, National Science Foundation (NSF), Directorate for Computer and Information Science and Engineering (CISE), Spring 2010
- Review panelist, National Science Foundation (NSF), Directorate for Computer and Information Science and Engineering (CISE), Fall 2009
- Review panelist, National Science Foundation (NSF), Directorate for Computer and Information Science and Engineering (CISE), Fall 2008
- Outside Reviewer, National Science Foundation (NSF), Directorate for Computer and Information Science and Engineering (CISE), Fall 2007

4.A.iii Other unpaid services to local, state, and federal agencies

- Production of video campaign and social media contest for Department of Defense anti-obesity initiative, in conjunction with Deputy Assistant Secretary of Defense for Health Affairs Summer 2012 – present

4.B Campus

4.B.i College⁸

- Program Director, HCI Masters Program, Summer 2012 – present
- Director, Human-Computer Interaction Lab (Spring 2011 – present)
- Member, HCI Masters Committee (Fall 2009 – Spring 2012)
- Member, iSchool Search Committee (Fall 2011– Spring 2012)
- Chair, iSchool Student Awards Committee (Fall 2011 – Spring 2012)
- Co-Director, HCIL (Spring 2009 – Spring 2011)
- Chair, iSchool Undergraduate Committee (Fall 2010 – Spring 2011)
- Member, iSchool Search Committee (Fall 2010 – Spring 2011)
- Member, iSchool Search Committee (Fall 2009 – Spring 2011)
- Member, iSchool ad hoc Research Committee (Fall 2009 – Spring 2011)
- Member, iSchool Undergraduate Committee (Fall 2008 – Spring 2009)
- Assistant Director, Center for Information Policy and E-Government (Fall 2007 – Spring 2010)
- Member, iSchool Doctoral Committee (Fall 2007 – Spring 2010)

⁷ Position on journal board, chairship/membership on conference program committees, and related reviewing activities already reported in Section 2.K are not repeated here.

⁸ Membership on dissertation/examination committees are listed in Section 3.F.iii and not duplicated here.

- Secretary, College Assembly (Fall 2008 – Spring 2009)

4.C University

- Member, University of Maryland Provost Search Committee (Fall 2011 – Spring 2012)

EXHIBIT B

Exhibit B: List of Materials Relied On

I relied on the following documents and materials in forming my opinions:

Documents from *Campbell, et al. v. Facebook, Inc.*:

Supplemental Responses and Objections to Plaintiffs' First Set of Interrogatories
Facebook's Second Supplemental Responses and Objections to Plaintiffs' Narrowed
Second Set of Interrogatories
Deposition of Ray He (September 25, 2015)
Deposition of Michael Adkins (October 28, 2015)
Plaintiffs' Consolidated Amended Complaint
Exhibit F to the Declaration of Alex Himel on Behalf of Defendant Facebook, Inc.

FB000011543
FB000002651
FB000003118
FB000002651
FB000002843
FB000007286
FB000006178
FB000010688
FB000008505
FB000010688
FB000008722
FB000000298
FB000008643
FB000008499
FB000002141
FB000002190
FB000002196
FB000006429
FB000000699
FB000002197
FB000001599
FB000001608-9
FB000000425
FB000005827
FB000005802-R
FB000008499
Source Code Produced by Facebook

Other Materials

<https://web.archive.org/web/20101016010319/http://developer.yahoo.com/blogs/ymdn/posts/2010/10/how-many-users-have-javascript-disabled/>

<https://gds.blog.gov.uk/2013/10/21/how-many-people-are-missing-out-on-javascript-enhancement/>

<https://www.facebook.com/notes/facebook-engineering/tao-the-power-of-the-graph/10151525983993920>

<https://web.archive.org/web/20101205130048/http://developers.facebook.com/docs/reference/plugins/activity>

<http://developers.facebook.com/docs/reference/plugins/activity>

<http://blogs.wsj.com/digits/2012/10/03/how-private-are-your-private-messages/>

<https://developers.facebook.com/blog/post/476>

<https://www.facebook.com/1556441609>

<https://www.facebook.com/michael.s.hurley.73>

Campbell v. Facebook Inc., 77 F. Supp. 3d 836, 844 (N.D. Cal. 2014).

In re Google Inc. Gmail Litig., 2013 U.S. Dist. LEXIS 172784 (N.D. Cal. Sept. 26, 2013)

In re Carrier IQ, Inc., Consumer Privacy Litig., 78 F. Supp. 3d 1051, 1076 (N.D. Cal. 2015)