

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

CISCO SYSTEMS, INC.
Petitioner,

v.

VUSURA TECHNOLOGY LLC,
Patent Owner,

U.S. Patent No. 11,227,303
Issue Date: January 18, 2022
Title: METHOD AND APPARATUS FOR CONTENT PRESENTATION IN
ASSOCIATION WITH A TELEPHONE CALL

Inter Partes Review No.: IPR2026-00255

**DECLARATION OF THOMAS F. LA PORTA IN SUPPORT OF PETITION
FOR *INTER PARTES* REVIEW OF
U.S. PATENT NO. 11,227,303**

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I, Thomas F. La Porta, declare as follows:

I. INTRODUCTION

1. I am over the age of eighteen (18) and otherwise competent to make this declaration.

2. I have been retained by Cisco Systems, Inc. (“Petitioner”) as an independent expert consultant in this proceeding before the United States Patent and Trademark Office. Although I am being compensated at my rate of \$650 per hour for the time I spend on this matter, no part of my compensation depends on the outcome of this proceeding, and I have no other interest in this proceeding. To the best of my knowledge, I have no financial interest in Petitioner.

3. The Petition for *inter partes* review involves U.S. Patent No. 11,227,303 (the “’303 Patent”) (EX-1001), titled “METHOD AND APPARATUS FOR CONTENT PRESENTATION IN ASSOCIATION WITH A TELEPHONE CALL” and listing Wendell D. Brown as the inventor.

4. For the purposes of this *inter partes* review, as discussed later, I have been instructed to assume that the effective filing date of the claims of the ’303 Patent challenged by the Petitioner in this *inter partes* review is no earlier than April 6, 2009, the filing date of provisional application 61/167,105.

5. I understand that according to USPTO records, the ’303 Patent is currently assigned to Vusura Technology LLC (“Vusura” or “Patent Owner”).

6. The '303 Patent is directed to providing multimedia content associated with a telephone call to a called party and/or calling party after the called party's number has been dialed but before the voice connection is made, after the voice connection is made, and/or after the voice connection is terminated. EX-1001, Abstract, 1:64-2:3. I am familiar with the technology described in the '303 Patent as of the earliest possible priority date of April 6, 2009.

7. In preparing this Declaration, I have reviewed the '303 Patent (EX-1001), the file history of the '303 Patent (EX-1002), and each of the documents cited herein, and I have considered these documents in light of the general knowledge in the art as of April 6, 2009. For convenience, the materials I considered in forming my opinion are listed in Appendix A. In formulating my opinions, I have relied upon my experience in the relevant art. I have also considered the viewpoint of a person of ordinary skill in the art ("POSITA") in the relevant field, as of April 6, 2009, who I describe below (§V.E).

8. The opinions and comments formulated during this assessment are based on observations and information available at the time of the investigation. The findings presented herein are made to a reasonable degree of scientific certainty. I have made every effort to accurately and completely investigate all areas of concern identified during my investigation.

9. I have been asked to provide my technical expertise, analysis, insights, and opinions regarding the '303 Patent and relevant references that form the basis of the arguments set forth in the accompanying Petition for *inter partes* review of the '303 Patent. As I describe in detail below, I offer the following opinions in this Declaration:

- A POSITA would have found Claims 1-25 of the '303 Patent obvious over *Roundtree*.

II. MY BACKGROUND AND QUALIFICATIONS

10. I am the Director of the School of Electrical Engineering and Computer Science at Penn State University. I am also an Evan Pugh Professor in the Department of Computer Science and Engineering and the Department of Electrical Engineering at Penn State University. I was the founding Director of the Institute of Networking and Security Research at Penn State. I have worked on telecommunications networks since 1986.

11. I received my B.E. and M.E. in Electrical Engineering from The Cooper Union for the Advancement of Science and Art in 1986 and 1987, respectively, and my Ph.D. in Electrical Engineering from Columbia University in 1992.

12. I joined AT&T Bell Labs (which later became Bell Labs, Lucent Technologies) in 1986 after receiving my B.E. degree, and pursued my M.E.

degree part-time. In my first job at Bell Labs, I tested the performance and interoperability of many data communication devices within the AT&T network. I transferred into Bell Labs Research in 1990 to pursue research full-time.

13. Starting in 1994, I performed research directed towards advanced services in telecommunications networks including broadband IN network and mobile and wireless networks. During this period, I worked extensively on signaling protocols and call processing for telephony networks and mobile data applications. A large portion of my work was directed at architectures, protocols, and software for enabling different types of services on wireless and broadband. This included extending Intelligent Network (IN) concepts to broadband and mobile networks, and providing IN-services via new architectures.

14. In 1997, I became the Director of the Mobile Networking Research Department within Bell Labs Research. This group, which included approximately 30 researchers and support developers, carried out basic research on mobile networks including cellular telephony, mobile Internet, integrated networks and mobile data services. In 2000, I was named the Director of the Advanced Mobile Networking Department within the Wireless Business Unit of Lucent Technologies. My role in this job was to work with development organizations to turn technology into products.

15. During both my development and research careers, I interacted extensively with computer scientists and engineers responsible for the design, development, and testing of telephony and data networking products with a focus on broadband and wireless networks and services. I received many patents related to the signaling and control of broadband and wireless networks including intercepting signaling messages to provide services to end users. Three of my patents related to signaling and control of these networks have been cited over 200 times each. I presented tutorials at major IEEE conferences on signaling and control in broadband ISDN networks and authored a chapter titled “Signaling” in the Wiley Encyclopedia of Electrical and Electronics Engineering published in 1999.

16. As a research manager, I oversaw a department that executed many large-scale joint projects with development organizations to release products for Lucent Technologies. Examples of such joint projects include, the control software for Lucent Technologies’ 3G network access controllers used for interconnecting CDMA base stations, processor overload controls in Lucent Technologies’ cellular soft switches, the industry’s first multi-protocol Home Location Register, servers and protocols for enabling services and interactive text messaging via cellular networks, the first systems to interwork 2G and 3G networks of different types with all-IP networks, and mobile Internet services.

These interactions exposed me to a wide range of computer scientists and engineers working on wireless network technologies and applications.

17. As the Director of both the Networking Research Department in Bell Labs and the Advanced Mobile Networking Department within the Wireless Business Unit of Lucent Technologies, I met extensively with product managers and marketing organizations for the Wireless Business Unit of Lucent Technologies and representatives of many cellular service providers. In these meetings, I would often present new concepts and product directions that the company was advancing in the wireless market.

18. I also taught as an adjunct member of the faculty at Columbia University in 1993 and from 1996-2001. I taught graduate classes in networking protocol design (1993) and mobile computing and networking (1996-2001). As such, I am familiar with the curricula taught to Electrical Engineers and Computer Scientists from the early 1990s until today.

19. I am a co-inventor on at least 39 United States Patents and 18 foreign patents, of which the large majority pertain to mobile telecommunications. Two of my patents, one of which helped enable the mobile Internet, were awarded the Thomas Alva Edison Patent Award by the Research and Development Council of New Jersey. For my early work I was recognized with an Eta Kappa Nu

Outstanding Young Electrical Engineer Award and the Bell Labs Distinguished Staff Award.

20. While at Bell Labs, I led my research department into creating new network, service, and software architectures for building some of the first wireless mobile data services. One example was building the first system that allowed for simple mobile phones to engage in two-way messaging (now called text messaging) which led to several published papers and five patents.

21. After joining Penn State, I continued my work on wireless networks and services including several that were based on location-based services. This included work on using the location of a user to provide access to services and preserving privacy for users while enabling location-based services. I also worked extensively on security aspects of mobile telecommunications networks.

22. Because of my expertise on security in wireless networks, I was appointed to The President's National Security Telecommunications Advisory Committee. My role on this Committee was to identify security risks for current and evolving cellular networks.

23. Based on this experience, and my continuing work at Penn State University, I have intimate knowledge of telecommunications networks and services. I have been highly recognized as an expert in such systems. I was recognized with the Bell Labs Distinguished Member of Technical Staff award in

1996 for “outstanding research in call processing.” I was named a Bell Labs Fellow in 2000, “[f]or outstanding contributions in mobile wireless networks in the area of call processing, signaling, mobility management, and applications.” I was named an IEEE Fellow in 2002 “for contributions to systems for advanced broadband, mobile data and mobile telecommunication networks.”

24. I previously served as the Editor-in-Chief of IEEE Personal Communications Magazine and was the founding Editor-in-Chief of IEEE Transactions on Mobile Computing. I have published over 350 technical papers.

25. My research has been supported primarily by the Department of Defense and the National Science Foundation. I was the Director of a center funded by the U.S. Army Research Lab studying network science as it relates to communication networks. I also led a recently concluded project funded by the U.S. Army Research Lab to provide cyber-deception to thwart cyberattacks and currently lead a project on multi-domain cyber-deception.

III. RELEVANT LEGAL STANDARDS

26. I am not a lawyer and do not provide any legal opinions in this Declaration. Although I am not a lawyer, I have been informed by counsel and understand that certain legal standards are to be applied by technical experts in forming opinions regarding the meaning and validity of patent claims. I have been asked to provide my opinions regarding whether the claims of the '303 Patent

would have been obvious to a person of ordinary skill in the art (“POSITA”) at the time of the alleged invention, in light of the prior art.

27. I have been informed by counsel and understand that a patent claim is not patentable under 35 U.S.C. § 103 if the differences between the patent claim and the prior art are such that the claimed subject matter as a whole would have been obvious at the time the claimed invention was made to a POSITA.

Obviousness, as I have been informed by counsel and understand, is based on the scope and content of the prior art, the differences between the prior art and the claim, the level of ordinary skill in the art, and, to the extent that they exist, certain objective indicia of non-obviousness.

28. I have been informed by counsel and understand that objective indicia can be important evidence regarding whether a patent is obvious or nonobvious, if it has an appropriate nexus to the claimed invention, i.e., is a result of the merits of a claimed invention (rather than the result of design needs or market-pressure advertising or similar activities). Such indicia include: commercial success of products covered by the patent claims; a long-felt need for the invention; failed attempts by others to make the invention; copying of the invention by others in the field; unexpected results achieved by the invention as compared to the closest prior art; praise of the invention by the infringer or others in the field; the taking of licenses under the patent by others; expressions of surprise by experts and those

skilled in the art at the making of the invention; and the patentee proceeded contrary to the accepted wisdom of the prior art.

29. I have been informed by counsel and understand that whether there are any relevant differences between the prior art and the claimed invention is to be analyzed from the view of a POSITA at the time of the invention. As such, my opinions below as to a POSITA are as of the time of the invention, even if not expressly stated as such; for example, even if stated in the present tense. In this case, as I discuss in section V.C below, I have been instructed to assume that “the time of the invention” for the claims of the ’303 Patent is April 6, 2009.

30. In analyzing the relevance of the differences between the claimed invention and the prior art, I have been informed by counsel and understand that I must consider the impact, if any, of such differences on the obviousness or non-obviousness of the invention as a whole, not merely some portion of it. The person of ordinary skill in the art faced with a problem is able to apply his or her experience and ability to solve the problem and also look to any available prior art to help solve the problem.

31. I have been informed by counsel and understand that a precise teaching in the prior art directed to the subject matter of the claimed invention is not needed. I have been informed by counsel and understand that one may take into account the inferences and creative steps that a POSITA would have employed

in reviewing the prior art at the time of the invention. For example, if the claimed invention combined elements known in the prior art and the combination yielded results that were predictable to a POSITA at the time of the invention, then this evidence would make it more likely that the claim was obvious. On the other hand, if the combination of known elements yielded unexpected or unpredictable results, or if the prior art teaches away from combining the known elements, then this evidence would make it more likely that the claim that successfully combined those elements was not obvious.

32. I have been informed by counsel and understand that there are recognized, exemplary, rationales for combining or modifying references to show obviousness of claimed subject matter. Some of the rationales include the following: combining prior art elements according to known methods to yield predictable results; simple substitution of one known element for another to yield predictable results; use of a known technique to improve a similar device (method or product) in the same way; applying a known technique to a known device (method or product) ready for improvement to yield predictable results; choosing from a finite number of identified, predictable solutions, with a reasonable expectation of success; known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are predictable to a POSITA; and

some teaching, suggestion, or motivation in the prior art that would have led a POSITA to modify the prior art reference or to combine prior art teachings to arrive at the claimed invention.

IV. OVERVIEW

33. The '303 Patent is directed to providing multimedia content associated with a telephone call to a called party and/or a calling party after the called party's number has been dialed but before the voice connection is made ("pre-ring"), after the voice connection is made ("in-call"), and/or after the voice connection is terminated ("post-call"). EX-1001, Abstract, 1:64-2:3. The content presented to a called or calling party may relate to parties on the telephone call, entertainment for one or more of the parties, commercial information (e.g., sales offers, transaction details, advertisements, coupons) and the subject matter of the call. EX-1001, Abstract, 9:3-34. The content presented may be displayed on a communication device of the called party and/or the calling party. EX-1001, 3:10-21. The '303 Patent independent claims recite providing multimedia content associated with a telephone call to a called party and/or a calling party after the called party's number has been dialed but before the voice connection is made ("pre-ring"), and providing additional content to the called or calling party after the voice connection is terminated ("post-call"). EX-1001, claims 1, 13, 14.

34. However, systems and methods for providing multimedia content associated with a telephone call to a called or calling party after the called party's number has been dialed, but before the voice connection is made, and providing additional content to the called or calling party after the voice connection is terminated, were well-known by April 2009. For example, as I explain in detail in section VII of my Declaration, the Roundtree reference (EX-1004) discloses that a system can decide to "enhance" a telephone call by providing content to the called or calling party's communication device at these same relative points in time – *i.e.*, before establishing the voice connection of a telephone call (*e.g.*, phone number is dialed but voice connection is not yet established), after the voice connection is established (during the voice call), or after terminating the voice connection. Roundtree describes that the content may include information about the parties, content directly or indirectly related to contents or subjects within the voice communications, graphics or other visual content, songs, tones or other audio content, and/or other content capable of providing communications to a user. Roundtree also provides two of the same examples provided by the '303 Patent illustrating (1) a call to a telephone service provider call center, and (2) a call to a pizza restaurant to order a pizza. Thus, in my opinion, Roundtree, which predates the '303 Patent by two years, discloses the limitations recited in the Challenged

Claims in the same way that the Challenged Claims read onto the '303 Patent's disclosure. *See* section VII of my Declaration.

V. BACKGROUND

A. Summary of the '303 Patent

35. The '303 Patent is directed to presenting multimedia content to a caller (calling party) and/or a called party in association with a telephone call. The '303 Patent explains that one problem with the prior art is that calls from or to a mobile telephone are typically accompanied by minimal display content. For example, when placing a call, the caller may simply see a dialer screen used to enter a telephone number, or to select a number or contact to be dialed. When receiving a call, a called party may see the caller's telephone number (or some other display if the number is blocked or unknown) or name of the caller (if the caller's telephone number is stored in the called party's contacts), but little else. EX-1001 1:29-43.

36. The '303 Patent's solution to enrich the experience of a person making or receiving a telephone call is to present multimedia content to a caller and/or called party in association with a telephone call. Content presented to a party may be related to another party participating in the call or may be related to a third party (e.g., an advertiser that paid to have its content presented). EX-1001 1:58-67, 2:4-7.

37. FIG. 2 (which I reproduce below) illustrates an embodiment of presenting content to a caller and/or a called party in association with a telephone call. At step A, the caller (210) enters or selects a telephone number or contact listing for called party 250, in order to initiate a voice call to that party. Alternatively, the caller (210) may enter part of the target party's name or number and select the party from results produced by her communication device and/or a source external to her device. EX-1001 8:25-33.

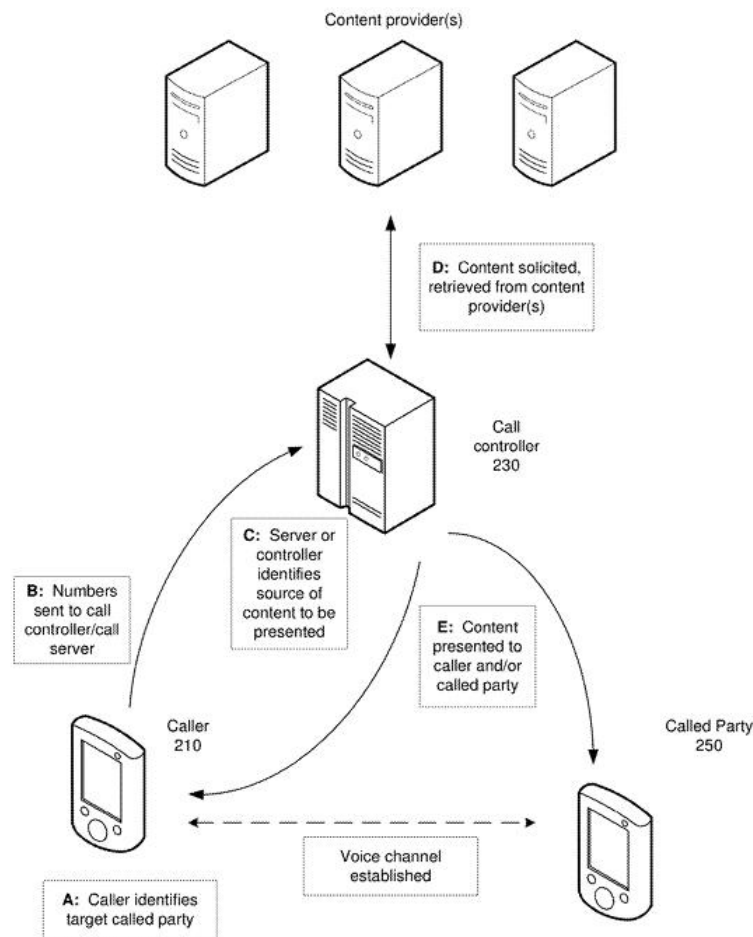


FIG. 2

38. At step B, the telephone numbers and/or other identifiers of the caller and called party (*e.g.*, IP addresses if either party is using VoIP equipment) are transmitted to call controller/call server 230 via a data channel of the caller's telephone. EX-1001 8:33-37.

39. In step C, call controller 230 identifies a source of content to be presented to caller 210 and/or called party 250, or may identify specific content (*i.e.*, not just a content source). In step D, the call controller solicits content from a selected source, which may be a web server, a data server, an advertisement server or other repository of advertisements, an organization's data server, etc. EX-1001 8:46-52. The '303 Patent describes that a call controller may be operated by, among other entities, a calling party or a called party, particularly when that party represents an organization. EX-1001 7:9-11, 3:48-50, 9:64-67, 10:27-34. The '303 Patent also describes that local storage on a party's communication device (*e.g.*, caller's, and/or called party's, telephone), or an internal database (*e.g.*, of an calling organization or called organization), may be a source of content to be presented to a caller and/or called party. EX-1001 5:61-6:1, 14:10-20, 8:49-52, 16:17-19.

40. Content may be selected for presentation based on an identity of a particular party, a relationship between the caller and the called party, an assumed (or known) purpose of the call, and/or other factors. EX-1001 8:53-56, 16:19-23.

41. In step E, call controller 230 forwards the selected content to either or both of the caller and the called party. In some embodiments, the content may be served directly to a caller or called party from a content provider. Content may be presented to either party before the called party's telephone rings, during the parties' voice call, and/or after the voice call is terminated. EX-1001 8:57-63.

42. The voice channel between caller 210 and called party 250 may be routed and established in a normal fashion. However, initiation of the voice connection may be delayed for a short period of time (e.g., by call processor logic operating on the caller's telephone). Thus, the actual voice connection may be completed (established) any time after FIG. 2 Step A. EX-1001 8:64-9:2.

43. The '303 Patent describes that a call may include a voice portion and a data portion, and that the voice portion of the call may be delayed to allow a data portion of the call to be established between the calling device and a server, a telephone agent (automated or human), an operator, or other entity. EX-1001 14:31-40. In my opinion, a POSITA understood that the '303 Patent's description of a "data portion" of a call refers to a data connection (channel) over which a calling party and/or called party may receive multimedia content (e.g., from a server, a telephone agent (automated or human), an operator, or other entity), and that is independent from the voice connection (channel) which, once established

(completed), couples the caller and called party for the “voice portion” of a call.

Id.; EX-1001 17:42-45, 11:31-33, 4:1-19, FIGS. 1-2.

44. The ’303 Patent describes that, in some embodiments, a call processor may delay signaling of a voice call from a caller’s telephone to the caller’s telephone service provider in order to delay establishment of the voice channel. For example, calls placed to certain numbers or to certain types of parties (e.g., merchants, other organizations) may be delayed while such pre-ring content is selected and transmitted to the caller’s telephone (*i.e.*, to the calling party’s telephone). EX-1001 4:37-47. The ’303 Patent also describes that content may be provided to the called party or calling party after the voice portion of the call is terminated (after one or both of the parties hang up, thereby terminating the voice channel of the call). EX-1001 17:50-58.

45. Illustrative content that may be presented to a caller or a called party **pre-ring** includes commercial offers and advertisements, private content such as pictures, communications, present status, current location, notifications, alerts, an identifier of the other party to the call (e.g., a corporate logo, a personal avatar), etc. EX-1001 9:3-10 (bold emphasis added); *see also* EX-1001 16:34-35, 4:37-43, 8:64-9:2.

46. Illustrative content that may be presented to a party **during a call** includes any or all types of content that may be presented **pre-ring**. **In-call**

content may also or instead relate to the parties' voice connection, perhaps to provide visual description of a subject of the parties conversation to graphically show different products or product options, to show a transcript of the conversation in real-time or near real-time (or provide other assistance to a hearing-impaired party), to guide a party through an IVR (Interactive Voice Response) menu, to provide customer assistance graphically, to exchange information textually/graphically instead of having to speak it or punch it in via a keypad, to promote an up-sell, to guide a party through an organization's telephone directory to find a desired person, etc. EX-1001 9:15-29 (bold emphasis added); *see also* EX-1001 16:35-36, 17:13-22.

47. Illustrative **post-call** content includes content that may be presented **pre-ring** and/or **in-call**. **Post-call** content may also or instead summarize the parties' conversation or transaction, provide a receipt, identify follow-on later appointment or other scheduled event, etc. EX-1001 9:30-34 (bold emphasis added); *see also* EX-1001 16:36-37, 17:50-58.

48. In other words, the '303 Patent describes presenting multimedia content to a calling party and/or called party at three time periods relative to a telephone call: (1) before establishment/completion of the voice connection/channel of the telephone call, also described as "pre-ring" and "before the called party's communication device rings"; (2) after the voice

connection/channel of the telephone call is established/completed, also described as “after the called party answers”, “in-call” and “during a call”; and (3) after the voice connection/channel of the telephone call is terminated, also described as “after one or both parties hangs up” and “post-call.” EX-1001 1:66-2:3, 4:37-47, 8:64-9:34, 14:31-40, 16:34-37, 17:13-22, 17:50-58, FIG. 2.

49. The ’303 Patent does not make any distinction that presenting multimedia content to a calling party and/or called party before a voice connection between the parties is established is more technologically challenging than presenting such content after the voice connection is established or after the voice connection is terminated. EX-1001 1:66-2:3, 4:37-47, 8:64-9:34, 14:31-40, 16:34-37, 17:13-22, 17:50-58, FIG. 2. Rather, the ’303 Patent treats the presentation of multimedia content to a calling party and/or called party at each of these relative time periods the same and identifies *the exact same method and apparatus* for presenting multimedia content to such parties at each of these relative time periods (where the source of such content may be local storage on a party’s communication device, an internal database of a calling organization or called organization, the other party (via a data connection between the parties), a third party (via a data connection between the content-receiving-party and the content source), etc.). *Id.* Indeed, the ’303 Patent describes that the exact same method and apparatus used to present content to either or both of such parties *in-call (during a voice call)* is also

used to present content to such parties *pre-ring (before the voice connection is established/completed)* and *post-call (after the voice connection is terminated)*. *Id.*

50. The '303 Patent issued with 25 Claims, with Claim 1 (method), Claim 13 (computer readable medium) and Claim 14 (apparatus). Claim 1 is representative of these claims:

1. A method of controlling presentation of content on a communication device, the method comprising:
 - upon receipt of notification of initiation of a communication connection from a first device associated with a first party to a second device associated with a second party:
 - pausing establishment of the communication connection without soliciting action by the first party; and
 - during said pausing, transmitting selected content toward the first device and/or the second device; and
 - after one of the first party and the second party terminates the communication connection, transmitting additional content toward the first device and/or the second device;
 - wherein the selected content comprises information regarding a previous transaction between the first party and the second party;
 - wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection; and
 - wherein the first device and/or the second device display the additional content after receipt.

51. While the '303 Patent describes embodiments for presenting content to a caller and/or a called party before, during and/or after a telephone call between the parties—*i.e.*, before a telephone call's voice connection is established ("pre-ring"), after the call's voice connection is established ("in-call"), and/or after the call's voice connection is terminated ("post-call")—, the independent claims are limited to embodiments for presenting content to a caller and/or a called party before "a communication connection" is established ("selected content"), and after "the communication connection" is terminated ("additional content"). The '303 Patent does not use the words "pausing", "communication connection", "additional content", or "new transaction" apart from the claims.

1. '303 Patent's Pizza Example

52. One of the '303 Patent's examples of presenting content to a caller and/or a called party is in association with a telephone call from a customer to a pizza restaurant to order a pizza. EX-1001 FIG. 4, 10:5-33. For this pizza example, as I explain below in paragraphs 53-54, the '303 Patent: (1) explicitly discloses presenting content to a customer caller and/or called pizza restaurant agent after the call's voice connection is established ("in-call"), and/or after the call's voice connection is terminated ("post-call"), regarding a transaction conducted during the voice connection, and (2) discloses to a POSITA presenting

content before the call's voice connection is established ("pre-ring") regarding a previous transaction between the parties.

53. Specifically, in this pizza example, the '303 Patent describes that a telephone agent associated with the pizza merchant (*i.e.*, the called party in this example) is the call controller that manages the presentation of content on the customer's telephone (*i.e.*, on the calling party's telephone). EX-1001 10:26-33. The only content specifically described in this example as being transmitted to the customer caller is "content 410 [that] verifies the customer's order (*i.e.*, for one large Chicago style pizza, with pepperoni) and the delivery address, and also reminds the customer of a special offer (*i.e.*, \$0.99 apple pies on Tuesday night)." EX-1001, 10:8-17, FIG. 4. The only content specifically described in this example as being transmitted to the called pizza merchant is "the caller's address (*e.g.*, home address, work address, current address)." EX-1001 10:18-25. The '303 Patent does specifically describe, in this pizza example, that the pizza merchant's telephone agent may transmit, "after the call" and over a data connection, details of the new pizza-ordering transaction conducted over the now-terminated voice connection between the calling customer and called pizza merchant (*i.e.*, the customer's order). EX-1001 FIG. 4, 10:5-17.

54. The '303 Patent describes that, especially when a called party is a commercial organization like a merchant, the voice call connection may be delayed

while a call controller (*e.g.*, agent that works for the called organization) presents pre-ring content that the agent believes may be useful to the calling party during the call, including details of a previous transaction between the caller and the organization. EX-1001 4:44-47, 7:11-22, 10:49-55, 14:5-16, 14:61-64, 15:18-24, 16:60-66. Accordingly, although these words do not specifically appear in FIG. 4 or 10:5-33, in my opinion, the '303 Patent discloses to a POSITA that the pizza merchant's agent may, before a voice connection between the calling customer and the pizza merchant is established, transmit information regarding a previous transaction between the pizza merchant and the customer to the customer over a data connection as the agent may believe such pre-ring information would be useful to, for example, simplify and speed up the current transaction. *Id.*; EX-1001 10:5-33.

2. '303 Patent's Customer Service Call Center Example

55. Another one of the '303 Patent's examples of presenting content to a caller and/or a called party is in association with a telephone call from a customer service provider call center to a customer that has an account with the service provider. EX-1001 FIG. 6, 10:60-11:20. For this customer service provider example, as I explain below in paragraphs 56-57, the '303 Patent: (1) explicitly discloses presenting content to a caller and/or called party before the call's voice connection is established ("pre-ring") regarding a previous transaction between the

parties, and (2) discloses to a POSITA presenting content after the call's voice connection is established ("in-call"), and/or after the call's voice connection is terminated ("post-call"), regarding a transaction conducted during the voice connection.

56. Specifically, in this customer service provider example, the '303 Patent describes that a telephone agent associated with the customer service provider (*i.e.*, the calling party in this example) is the call controller that manages the presentation of content on the customer's telephone (*i.e.*, on the called party's telephone). EX-1001 11:17-20. The only content specifically described in this example as being transmitted to the customer called party is "content 610... presented pre-ring (*i.e.*, before [the customer's] telephone rings)", which includes "some digits of the [customer's] account number,... details of a previous transaction with the organization, etc.", or "controls for taking action such as accepting the call as planned, completing the call immediately, postponing the call, scheduling it for a particular time, etc.". EX-1001 10:59-11:13, FIG. 6.

57. The '303 Patent describes that, especially when the calling or called party is an organization or commercial enterprise, a call controller (*e.g.*, telephone agent that works for a calling customer service provider) may select in-call and/or post-call content for presentation on the customer called party's communication device that directly relates to the ongoing, and/or recently terminated, call between

the telephone agent and the customer (*e.g.*, a transaction summary, information regarding a current or recent transaction). EX-1001 3:33-39 (“information regarding a current or recent transaction”, 7:11-17 (“current transaction between the parties”), 15:15-27 (“details of a... current transaction between the caller and the organization”), 22:15-19 (“[p]ost-call content may directly relate to the call (*e.g.*, a receipt , an invoice , a transaction summary)”). Accordingly, although these words do not specifically appear in FIG. 6 or 10:60-11:20, in my opinion, the ’303 Patent discloses to a POSITA that, after a voice connection between a customer called party and the calling service provider’s telephone agent is terminated, the provider’s agent transmits, over a data connection, details of a transaction recently conducted over the now-terminated voice connection between the provider’s agent and the customer. *Id.*

B. Prosecution History of the ’303 Patent

58. From the face of the patent, I understand that the ’303 Patent issued from U.S. Patent Application No. 16/597,052, filed October 9, 2019 and, as I discuss in the Priority Date section V.C below, claims priority, through a series of continuation patent applications, to U.S. Provisional Patent Application No. 61/167,105, filed April 6, 2009. EX-1001 pp. 1-2 (fields numbered (21)-(22), (60), (63)).

59. The claims of the were rejected numerous times over the prior art until the Applicant amended the independent claims to include the limitations shown below in underline:

1. (Currently amended) A method of controlling presentation of
2 content on a communication device, the method comprising:
upon receipt of notification of initiation of a communication connection
4 from a first device associated with a first party to a second device associated with
a second party:
6 pausing establishment of the communication connection without
soliciting action by the first party; and
8 during said pausing, transmitting selected content toward the first
device and/or the second device; and
10 after one of the first party and the second party terminates the
communication connection, transmitting additional content toward the first device
12 and/or the second device;
wherein the selected content comprises information regarding a previous
14 transaction between the first party and the second party;
wherein the additional content comprises information regarding a new
16 transaction conducted between the first party and the second party during the
communication connection; and
18 wherein the first device and/or the second device display the additional
content after receipt.
20 ~~wherein the selected content comprises a guide to routing the~~
~~communication connection;~~
22 ~~wherein the guide comprises a menu for routing the communication~~
~~connection within an organization comprising the second party; and~~
24 ~~wherein the first device and/or the second device display the selected~~
~~content after receipt.~~

EX-1002 33-42 (August 31, 2021 Amendment and Response to July 20, 2021

Non-final Office Action); *see also* EX-1002 279-284 (original filed claims), 172-

192 (April 16, 2020 Non-final Office Action), 159-167 (July 16, 2020 Amendment and Response), 139-153 (August 26, 2020 Final Office Action), 120-132 (January 12, 2021 Appeal Brief), 86-106 (February 24, 2021 Non-final Office Action), 72-84 (May 12, 2021 Amendment and Response), 46-65 (July 20, 2021 Non-final Office Action).

60. I understand that, in the Notice of Allowance, the USPTO Examiner stated:

As to claims 1, 13 and 14, in combination with other limitations of the claims, the prior art of record fails to disclose or specifically suggested wherein the selected content comprises information regarding a previous transaction between the first party and the second party, wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection, and wherein the first device and/or the second device display the additional content after receipt. In the specific with combined limitations recited in the claims. EX-1002 14; *see also* EX-1002 8-18 (September 13, 2021 Notice of Allowance).

C. Priority Date of the Challenged Claims

61. For the purpose of this *inter partes* review (“IPR”), I have been instructed by counsel to assume that the effective filing date of each of the Challenged Claims is the filing date of U.S. Provisional Patent Application No. 61/167,105, which is April 6, 2009. EX-1001 p. 2 (field numbered (60)). In this

Declaration, when I use the shorthand “Priority Date”, I am referring to April 6, 2009.

D. Claim Construction

62. I have been informed by counsel and I understand that in order to properly evaluate the Challenged Claims of the '303 Patent, the terms of the claims must first be interpreted. I have been informed by counsel and I understand that, for the purposes of this *inter partes* review, the claims are to be construed under the so-called *Phillips* standard, under which claim terms are given their ordinary and customary meaning as would be understood by a person of ordinary skill in the art (“POSITA”, defined below in Section V.E) as of the Priority Date (*see* Section V.C above) in light of the specification and prosecution history, unless the inventor has set forth a special meaning for a term. That is the meaning that I have applied in my analysis.

63. I have been informed by counsel that no court or administrative board has construed any of the claims of the '303 Patent. If a board or court construes any term of the '303 Patent, I reserve the right to supplement my opinions in view of such construction. I have also been informed by counsel that the Board does not construe claim terms unless the terms are in controversy, and then only to the extent necessary to resolve the controversy.

64. I have followed these principles in my analysis throughout this Declaration. It is my opinion that no specific construction of any claim term is required because the relied-upon prior art meets each of the claim terms under any proper construction.

E. Level of Ordinary Skill in the Art

65. I have been informed by counsel and I understand that a person of ordinary skill in the art (“POSITA”) is a hypothetical person who is presumed to be aware of all pertinent prior art, thinks along conventional wisdom in the art, and is a person of ordinary creativity. I have also been informed by counsel and understand that there are multiple factors relevant to determining the level of ordinary skill in the pertinent art, including (1) the levels of education and experience of persons working in the field at the time of the invention; (2) the sophistication of the technology; (3) the types of problems encountered in the field; and (4) the prior art solutions to those problems.

66. In my opinion, a person of ordinary skill in the art (“POSITA”) in the field of the ’303 Patent, as of its April 2009 Priority Date (*see* Section V.C above), would have been someone knowledgeable and familiar with call processing techniques and providing enhanced data content to cell phones. In my opinion, a POSITA would have gained knowledge of these concepts through a mixture of training and work experience, such as by having at least a bachelor’s degree in

electrical engineering, computer science, or a related field, and at least two to three years of training or additional work experience in the area of telecommunications, or a related field. Additional hands-on and design experience could compensate for less formal education, and vice versa.

67. The knowledge and skill of a POSITA is further reflected in the prior art references themselves, as well as in the State of the Art, which I discuss in section V.F below.

68. For purposes of this Declaration, in general, and unless otherwise noted, my statements and opinions, such as those regarding my experience and the understanding of a POSITA generally (and specifically related to the references I consulted herein), reflect the knowledge that existed in the field as of the Priority Date of the '303 Patent. Unless otherwise stated, when I provide my understanding and analysis below, it is consistent with the level of a POSITA as of the Priority Date of the '303 Patent.

F. State of the Art

69. This section describes the state of the art as of the April 2009 Priority Date of the '303 Patent (*see* section V.C above). This section, and the documentary evidence that I cite in this section, provide additional factual support for the general knowledge, creativity and skill of a POSITA as of the Priority Date. This section provides additional factual support and motivation to modify and

combine the teachings in the prior art reference that I discuss in section VII of my Declaration, and further demonstrates why doing so would involve a reasonable expectation of success.

70. In my opinion, providing content to a calling party or to a called party before, during, or after a voice call connection, and providing such content over a data communication channel that was separate from the speech (voice) communication channel, was well-known in the art by April 2009.

71. One such architecture, which provided content over a data communication channel that was separate from the speech (voice) communication channel before, during, or after a voice call connection, was known as Intelligent Networks (IN), was introduced in the 1980s and was well-known and widely used in the 1990s as AINs. In AINs, the separate data communication channel included the user interface (UNI), which used the D-channel, and the CCS network between switches and between switches and databases/processors. EX-1007, xi, 13--22, 22-23 (*e.g.*, “what is needed is a *data communication channel* separated from the speech channels. Common channel signaling (CCS) provides that facility, and consequently, CCS is a fundamental base for building the required signaling within an intelligent network.”), 34-38, 44-55 (“A CCSS No. 7 is a valuable component to have in your network because it provides a 64-Kbps ‘data communication channel’ for almost free use... There are two basic parts of a communication link between

two points on a network: 1. The speech channel, on which calls are conveyed (a ‘speech’ channel is equivalent to other channels that transmit information between users, i.e., for data, text, pictures, and so on); 2. The signaling channel, which handles control information for the call, setting up a speech channel, releasing it, transferring numbers, and so on... CCS offers a more efficient use of signaling channels and the freedom to transfer call setup data and any other information via these channels... a... setup that uses the TCAP/INAP on a CCSS No. 7 network... allows signaling and speech to be separated; the TCAP/INAP works as a protocol conveyed by signaling channels, which, in turn, are regarded as a *separate network* (from the speech network), or a signaling network.”); EX-1008, 144-150.

72. For example, a long-standing service implemented by IN logic was “calling line identification (CLI)” in which, during call setup (before a call was answered), the calling party’s identity was transferred to the called party (and may be presented on the called party’s telephone). EX-1007, 45, 83, 111-114. As an example using this IN-implemented CLI service, when an account holder calls his insurance company, the company’s telephone agent could use the calling party’s identity, which was transferred during call setup (before the call is answered), to immediately find the calling party’s personal file on the agent’s computer to simplify and speed up the current transaction by giving the calling party a quick reply to his/her questions. EX-1007, 45, 113.

73. Another example of a long-standing service implemented by IN logic was “malicious call identification” in which, after an obscene/malicious call was received and terminated, the called party initiated this service on his terminal within a certain period of time (to request a trace of the recently terminated call) and, once initiated, the IN logic registered the calling party’s number and presented such content to the called party. EX-1007, 67, 72.

74. Another well-known architecture, which provided content over a data communication channel that was separate from the speech (voice) communication channel before, during, or after a voice call connection, was the Integrated Services Digital Network (“ISDN”), which was standardized in 1983 and usable to implement IN logic. EX-1008, 186-188; EX-1007, 28, 36, 145-146. In ISDN configurations for residential services, there would typically be three channels to the house: two voice channels (called B channels for bearer) and a data channel (called the D channel):

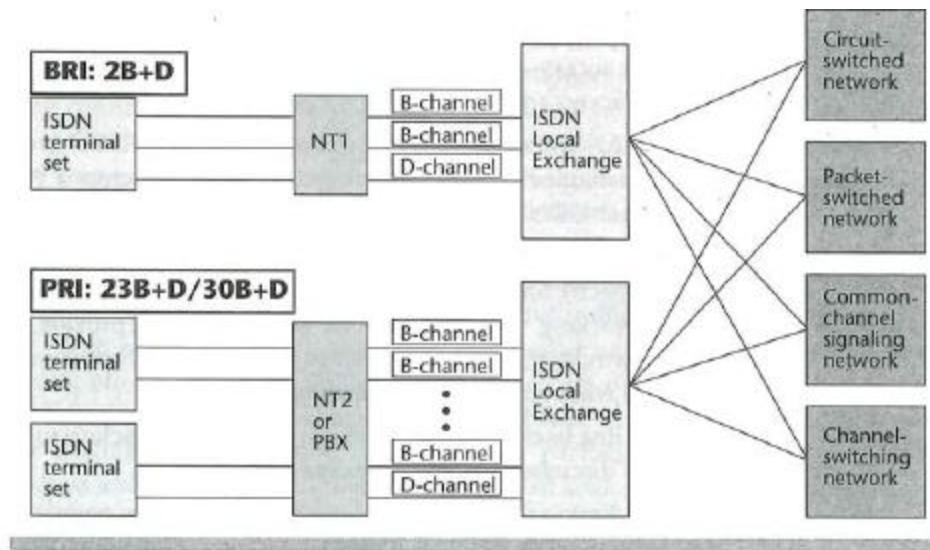


Figure 7.11 N-ISDN network interfaces

EX-1008, 187-188, FIG. 7.11 (reproduced above).

75. An example application in which ISDN was used to provide multimedia content to a caller and/or called party over the “D channel” before, during, or after a voice call connection over a “B channel” was “High-capacity access” where a user “needed to increase [his/her] capacity for things such as graphics, file transfer, video, and multimedia networking.” EX-1008, 187-188, FIG. 7.11.

76. Another example of a prior art architecture for providing content to a calling party or to a called party before, during, or after a voice call connection is described in EX-1005. After a called party number has been dialed and during call setup, logic determined content to be “pushed” to the called or calling party prior to the call being answered (during call setup), while the call is in progress, or after the call connection is completed. EX-1005 [0039]. The content to be delivered

was determined by application logic and could be based on profiles and preferences of the called and calling party, including identity of the calling party, the identity of the called party, a third party identity, the call history information, time of the day, season, relationships, default order to play the push content in case of simultaneous incoming calls from, for example, unknown callers or push content and combinations thereof. EX-1005 [0044].

77. Another prior art system describes providing content in the form of advertisements for goods and services to the calling party before pushing a dial tone or instead of dial-tone, or during the ringing of the called party, or during an active voice call after completion of the voice connection, or after termination of the call. EX-1006 [0008], [0009], [0024], [0035], [0037], [0040], [0050]; FIG. 3. The content of the ads selected to be sent to the called or calling party is based on the personal interests and/or other characteristics of one or more telephony end-users. EX-1006 [0031].

78. In my opinion, as illustrated in the above examples in this section V.F, the architecture and methods for identifying, retrieving, and displaying multimedia content to a called party or calling party before, during or after a telephone call were well-developed by 2009, and the '303 Patent simply uses these architectures and techniques for their intended purpose to provide various content to the called and calling parties.

VI. CHALLENGES

A. Identification of Challenge

79. Based on my understanding of the law of obviousness discussed in section III above, Claims 1-25 of the '303 Patent are unpatentable as being obvious over Roundtree.

Ground	Claims	Basis	Reference
1	1-25	§ 103	Roundtree (EX-1004)

B. Prior Art

80. I have been informed by counsel and I understand that U.S. Patent Publication No. 2007/0173237 (“Roundtree”) (EX-1004) qualifies as prior art under pre-American Invents Act (“pre-AIA”) 35 U.S.C. § 102(b) or § 102(e), as it was filed on February 7, 2007 and published on July 26, 2007. EX-1004, 1.

VII. IDENTIFICATION OF HOW CLAIMS ARE UNPATENTABLE

A. Ground 1: Claims 1-25

The Challenges are set forth in detail below and summarized as follows:

1. The Roundtree Reference

81. Roundtree is directed to a system and method for enhancing voice calls with data services. EX-1004 [0029]. Roundtree describes that the use of mobile devices has rapidly increased in recent years. This increase is due in part to services available on mobile devices. In addition to traditional voice calls, mobile devices allow users to communicate via email, text messaging, instant messaging,

and so on. Some mobile devices provide music playback, video playback, games, photo taking and sharing and other content, often interacting with users via full color displays. EX-1004 [0002]-[0003].

82. Like the problem in the prior art identified by the '303 Patent, Roundtree identifies that one problem in the prior art is that despite these additional capabilities for communicating multimedia content and presenting such content on mobile device displays, users place (or receive) voice calls using their mobile devices without utilizing such capabilities. That is, when using a mobile device to communicate over a data channel, such as a text message, a user may utilize and send a photo with the text message, synergizing several different capabilities of the mobile device. In contrast, users do not utilize other capabilities of the mobile device (such as these capabilities for communicating multimedia content and presenting such content on mobile device displays) during voice communications. EX-1004 [0003].

83. Like the '303 Patent's solution "to enrich the experience of a person making or receiving a telephone call", Roundtree describes that a solution to the same identified problem involves "enhancing voice calls with data services." EX-1004 [0029]. For example, Roundtree describes that a system for enhancing voice calls with data services may receive an indication of a voice call (such as a dialed number), intercept the voice call to determine if the dialed number is associated

with data services, and provide the data services to a user. The data services may be provided by providing content to a user via a display on the user's mobile device. The system may display graphics or other visual content, songs, tones or other audio content, and other content capable of providing communications to a user. EX-1004 [0029]-[0030].

84. Like the '303 Patent, Roundtree describes that initiation of a voice call begins with the calling party dialing a phone number or selecting the number of a called party. EX-1004 [0054]. Roundtree discloses the identical concept of delaying the voice portion of a telephone call to determine whether to display enhanced data, but does not use the word "pausing" or "delaying." EX-1004 [0029]-[0030]. Instead, Roundtree describes intercepting a call to determine whether to provide enhanced content to the called or calling party. EX-1004 [0029].

85. Roundtree includes a broad disclosure that before, during, or after completion of a voice call, it can determine if the voice call is to be enhanced. EX-1004 [0055], [0073]. Like the '303 Patent, Roundtree uses the word completion of a voice call to mean the voice connection has been established. EX-1004 [0050] ("If the number does not match, then the mobile device allows the call to be completed to a call center."), [0054] ("The system, in block 712, completes, connects, or establishes the voice call. The system maintains the voice call until, in

decision block 714, the system receives an indication that the user has ended the voice call.”), [0055] (“Before, during, or after completion of the voice call, as in block 712, the system, in block 720, decides if the voice call is to be enhanced.”). Thus, when Roundtree describes that it determines whether the voice call is to be enhanced “before, [or] during... completion” of the call, this is during the time period after initiation of the telephone call (*e.g.*, phone number dialed/selected) but before the voice connection is made. EX-1004 [0055], [0073]. Additionally, like the ’303 Patent, when Roundtree describes that it determines whether the voice call is to be enhanced “after completion” of the call, this is referring to the time period after the voice connection is established. EX-1004 [0055], [0073]. Like the ’303 Patent, Roundtree further discloses that content may be provided to the called party or calling party after the voice portion of the call is terminated. EX-1004 [0071]-[0072].

86. One embodiment for enhancing voice calls with content is described with respect to FIG. 7A (reproduced below) and FIG. 7B.

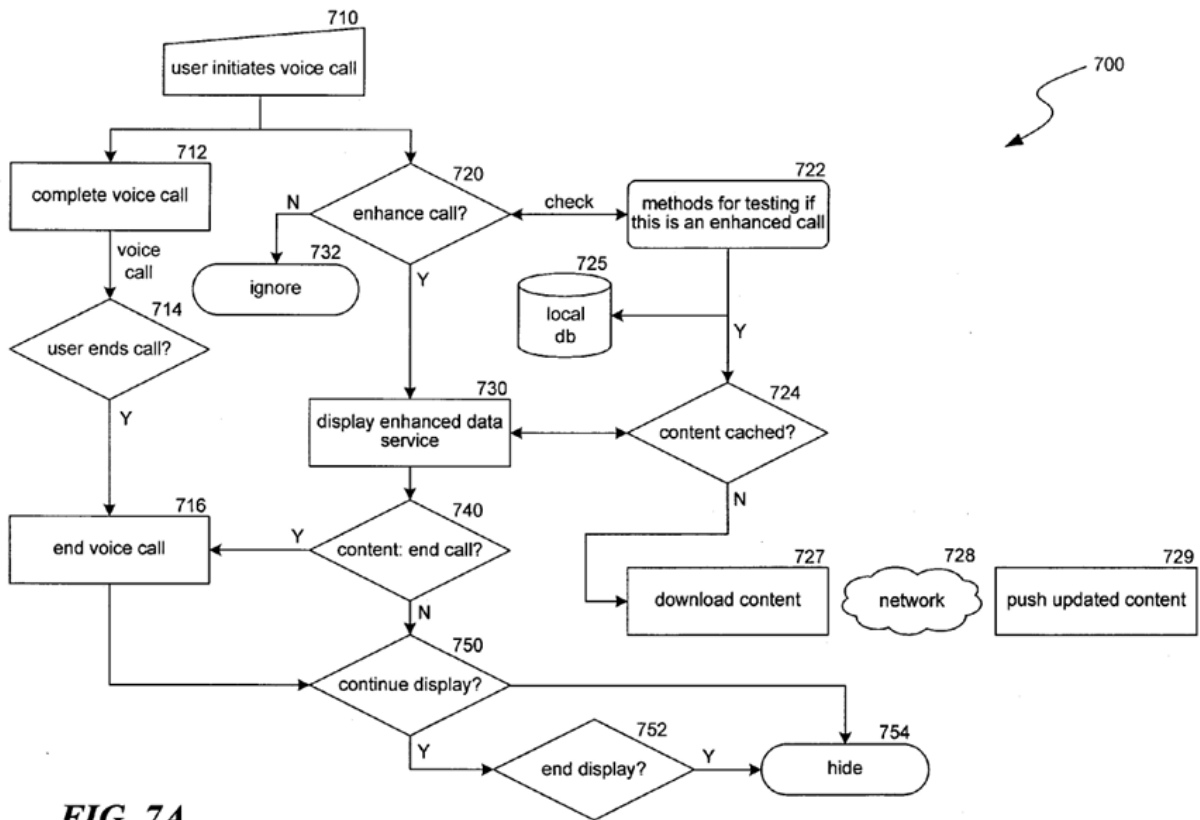


FIG. 7A

87. In block 710, the system receives an indication of a user-initiated voice call. Once the voice call is initiated, the routine 700 proceeds to block 712 (for the voice connection aspect of the call) and to block 720 (for possible enhancements to the call). The system, in block 712, completes, connects, or establishes the voice call. The system maintains the voice call until, in decision block 714, the system receives an indication that the user has ended the voice call. If the system receives the indication, the routine 700 proceeds from decision block 714 to block 716, and the system ends the voice call. EX-1004 [0054]-[0055], FIG. 7A.

88. Before, during, or after completion of the voice call, as in block 712, the system, in block 720, decides if the voice call is to be enhanced. The system proceeds through some or all of a number of different methods in determining whether or not to enhance a call. EX-1004 [0055], FIG. 7A.

89. Decision block 720 determines if the initiated voice call supports data enhancements. If the system determines the initiated voice call does not support data enhanced services, the routine proceeds to block 732, and proceeds as a typical voice call, effectively ignoring any data enhancement aspects. However, if the system determines the initiated voice call supports data services, the routine proceeds to block 730, and the system displays the enhanced services. The system may, in decision block 724, check for content 727, may download or otherwise obtain content from other non-local databases 729 via a network 728. The system may display content stored in both the local database 725 and one or more remote databases 729. EX-1004 [0063], FIG. 7A.

90. Upon displaying the content, the system, in decision block 740, determines if the voice call is to end. If the system determines the call is to end, routine 700 proceeds to block 716, and the system ends the call. The system may determine to end the call from the displayed content, from user input, and so on. If the voice call is to remain connected, routine 1110 proceeds to decision block 750, and the system determines whether or not to continue displaying the content. The

system may then end the display (block 752), hide the display from the user (block 754) or continue displaying the enhancements to the user. The system may choose one or more of these options depending on user input, on the type of displayed enhancement, on duration of the voice connection, on a lack of user activity with respect to the displayed content, and so on. EX-1004 [0064], FIG. 7A.

91. Furthermore, in some cases, routine 700 may proceed from block 716 (when the system ends the voice call) directly to block 750 (when the system decides to continue or end displaying enhanced data services). EX-1004 [0065], FIG. 7A.

92. Accordingly, just like the '303 Patent, Roundtree describes providing multimedia content to a calling party and/or called party at each of the same three time periods relative to a telephone call: (1) before establishment/completion of the voice connection/channel of the telephone call; (2) after the voice connection/channel of the telephone call is established/completed; and (3) after the voice connection/channel of the telephone call is terminated. Moreover, just like the '303 Patent, Roundtree describes that the source of such multimedia content, that is provided to such parties at any of these relative time periods, may be local storage (content store) on a party's communication device, an internal database (content store) of a calling establishment/provider or called establishment/provider, the other party (via a data connection between the parties), a third party (via a data

connection between the content-receiving-party and the content source), etc. EX-1004 [0029]-[0032], [0063], [0066], Claims 16-19. Just like the '303 Patent, Roundtree provides several examples of a system that augments a voice call with data services.

a) Roundtree's Pizza Example

93. Like the '303 Patent, one of Roundtree's examples of providing content to a caller and/or a called party is in association with a telephone call from a customer to a pizza restaurant to order a pizza. EX-1004 FIGS. 8A-8C, [0067]-[0071]. For this pizza example, as I explain below in paragraphs 94-97 and like the '303 Patent pizza example, Roundtree: (1) explicitly discloses presenting content to a customer caller and/or called pizza restaurant after the call's voice connection is established/completed, and after the call's voice connection is terminated, regarding a transaction conducted during the voice connection, and (2) discloses to a POSITA presenting content before the call's voice connection is established regarding a previous transaction between the parties.

94. Specifically, in this pizza example, the content specifically described by Roundtree as being transmitted and displayed to the customer calling party includes, (1) "after completion of the voice call" (*i.e.*, after the call's voice connection is established), "content... to illustrate available choices to the user (similar to giving the user a menu at the restaurant)", "content... to display results

of the order”, “the user’s order details 855”, “confirmed order details 865”, and “the order and payment details 875”; and, (2) after “end[ing] the voice call” (*i.e.*, after terminating the voice connection), content “based on status of the user’s order (such as provid[ing] a display showing the order as ‘in preparation,’ in transit, ‘delivered,[’] ‘transaction complete,’ and so on).” EX-1004 FIGS. 8A-8C, [0070]-[0071].

95. Accordingly, just like the ’303 Patent pizza example, Roundtree does specifically describe, in this pizza example, that, after “end[ing] the voice call”, the pizza restaurant’s employee may transmit, over a data connection, details of the new pizza-ordering transaction conducted over the now-terminated voice connection between the calling customer and called pizza restaurant (*i.e.*, the customer’s order, status of the ordered pizza, and delivery status), which are displayed on the customer’s mobile device after receipt. EX-1004 [0071].

96. Like the ’303 Patent pizza example, although these exact words do not specifically appear in Figures 8A-8C and paragraphs [0067]-[0071], as I explain in the below paragraph 97, in my opinion, Roundtree discloses to a POSITA that, before the voice connection between the calling customer and the called pizza restaurant is established, information regarding a previous transaction between the pizza merchant and the customer may be transmitted to the calling customer’s

mobile device over a data connection. EX-1004 [0083] (“historical information about previous calls”).

97. For example, in its pizza example, Roundtree describes that “the system may... save any or all displays, depending on user preferences” from the recently completed pizza ordering transaction (*e.g.*, FIG. 8C). EX-1004 [0071]. In my opinion, a POSITA understood “sav[ing]... displays” to mean saving the content that was displayed (*e.g.*, saving “order details” (“one large pepperoni pizza with extra sauce”) for the recently completed transaction as shown in FIG. 8C). EX-1004, [0071]. Additionally, in its pizza example, Roundtree describes that “the system may encode a token in the dialing string [for the calling party’s ‘favorite pizza delivery establishment’] that indicates that the following dialed inputs are part of an enhanced data link identification[, *e.g.*,] a dialed string such as ‘1-800-749-9263*669’ may relate to retrieving enhanced content from URL ‘http://www.18007499263*669.’” EX-1004, [0069], [0067]. And, in its pizza example, Roundtree describes that “[t]he system may use some or all of the enhanced number lookup methods discussed herein” (EX-1004 [0068]), which a POSITA would understand to include, for example, the calling customer’s mobile device intercepting the user’s call to the pizza restaurant and, before a voice connection is made, launching a browser to the predetermined “http://www.18007499263*669” webpage via a data network connection that

displays, based on the customer's preferences, historical information about previous calls (*e.g.*, saved previously displayed content regarding prior transactions between the customer and the pizza restaurant). EX-1004 [0067]-[0069], [0071], [0050] ("if the number dialed matches a number stored on the mobile device... the mobile device may intercept the incoming call and... launch a browser to a predetermined webpage via a network connection"), , [0075] ("Before a voice connection is made, the system launches a web browser corresponding to the dialed number..."), [0082]-[0083] ("the system may contain a database relating unique identifiers for mobile devices and corresponding... information about the mobile device" such as "historical information about previous calls.").

b) Roundtree's Customer Service Call Center Example

98. Like the '303 Patent, another one of Roundtree's examples of providing content to a caller and/or a called party is in association with a telephone call between a subscriber and a customer service call center. EX-1004 FIGS. 11-14, [0080]-[0093]. For this customer service call center example, as I explain below in paragraphs 99-104 and similar to the '303 Patent customer service call center example, Roundtree: (1) explicitly discloses presenting content to a subscriber caller and/or a called customer service provider agent after a call's voice connection is established regarding a transaction being conducted during the voice connection, and before a call's voice connection is established regarding a previous

transaction between the parties, and (2) discloses to a POSITA presenting content after the call's voice connection is terminated regarding a transaction conducted during the now-terminated voice connection.

99. Specifically, in its customer service call center example, Roundtree discloses that, “[w]hile on a call with a subscriber” (*i.e.*, after a call's voice connection is established) in order to “quickly correct issues” during the call and without having to “ask [the subscriber] to call back on a land line”, a called customer service call center agent “can, from his or her desktop computer, send diagnostic commands over the air to [a calling subscriber's] mobile device” and, “[i]n response, the mobile device retrieves or gathers diagnostics and status information and sends them back to the agent's computer, via the network.” EX-1004 [0089]. Also, in this example, Roundtree discloses that, for each of these subscriber-call center transactions, “[t]he system may then relate the transmitted information to a unique identifier of the [subscriber's mobile] device and store the information in the database.” EX-1004, [0082]. Likewise, in this example, Roundtree discloses that “[t]he system may also resolve handset issues and record how the matter was resolved.” EX-1004 [0088]. Then, “upon receipt of a unique [subscriber] identifier” of a mobile device of a calling subscriber for a subsequent telephone call between the parties, and “before a voice conversation occurs,” a representative at the customer service call center may retrieve, from the database,

“historical information about previous calls” with the subscriber. EX-1004 [0082]-[0083].

100. Accordingly, just like the '303 Patent customer service call center example, Roundtree does specifically describe, in its customer service call center example, that, “before a voice conversation occurs”, a party to the call (here, the customer service representative) may receive, over a data connection, information regarding a previous transaction between the customer service call center and the subscriber (*i.e.*, “historical information about previous calls”). EX-1004 [0082]-[0083]; *see also* paragraph 99 above *citing* [0088] (“system may... resolve handset issues and record how the matter was resolved”, which a POSITA would understand to be “record[ed]” in the database described in [0082] as “historical information about [a] previous call” described in [0083]), [0089] (describing information transmitted between parties to resolve subscriber handset issues during a call and that a POSITA would understand would be stored in the database described in [0082] as “historical information about [a] previous call” described in [0083]), [0090] (describing customer service display 13, on the call center agent’s computer, as including “a report and history portion” which a POSITA would understand to be retrieving information from the database described in [0082]), FIG. 13.

101. Like the '303 Patent customer service provider example, although these exact words do not specifically appear in Figures 11-14 and paragraphs [0080]-[0093], as I explain in the below paragraphs 102-104, in my opinion, Roundtree discloses to a POSITA that, after the voice connection between the subscriber and the customer service call center agent is terminated, information regarding a new transaction conducted between the called customer service call center and the calling subscriber during the now-terminated voice connection may be transmitted over a data connection to, and be displayed after receipt at, the called customer service call center agent's computer and at the calling subscriber's mobile device.

102. For example, a POSITA understood Roundtree discloses that, after an agent of the called customer service call center "correct[ed] issues" with a calling subscriber's mobile device ("handset") "[w]hile on a call with [the] subscriber", "[t]he system... record[ed] how the matter was resolved" in the database described in [0082], and after the voice connection of the call is terminated, the call center agent may retrieve information regarding this recently completed transaction from the database, and via the network, using the agent's computer and, after receipt, display such information on such computer (*e.g.*, FIG. 13, [0090] "report and history portion", "tab... display[ing] the history of the handset"). EX-1004 [0082], [0088]-[0089].

103. Roundtree also describes, with reference to FIG. 6B, for intercepted calls routed to a customer service call center, the subscriber's mobile device may "retrieve[] data or scripts from the network to address the subscriber's support issue" and, if "the call center determines... no more items need to be processed, then the subscriber's call ends." EX-1004 [0051]-[0052]. Additionally, Roundtree describes, with reference to FIG. 9, that, "[i]n block 940, the system may execute a script associated with the dialed number [*e.g.*, customer service call center]... [t]he script may then end the voice call and begin displaying content to the user, as in block 950... [t]he script may output text, images or other content to a display screen of the user's device." EX-1004 [0074]. And, Roundtree describes, with reference to FIG. 7A, for intercepted voice calls supporting data services [*e.g.*, to a customer service call center], the system may "download or otherwise obtain content from... non-local databases 729 via a network 728", "display content stored in... one or more remote databases", and "may proceed from block 716 (when the system ends the voice call) directly to block 750 (when the system decides to continue... displaying enhanced data services)." EX-1004 [0063]-[0065].

104. Accordingly, in my opinion, Roundtree discloses to a POSITA that, after the voice connection between a calling subscriber and a called customer service call center agent is terminated, a subscriber may download information

regarding how his/her handset issue was resolved during the now-terminated call with the customer service call center from a remote database and, after receipt, display it on the handset. EX-1004 [0088]-[0089], [0051]-[0052], [0063]-[0065], [0074], [0044]-[0045] (rendering platform 312 and User Interface server 314), FIG. 3.

2. Detailed Application of Roundtree to the Challenged Claims

Claim 1

[1.0] A method of controlling presentation of content on a communication device, the method comprising:

105. To the extent the preamble is limiting, Roundtree discloses this limitation. Roundtree describes a system and method for enhancing voice calls with data services. EX-1004 [0029]. Roundtree describes that the system may provide data services (*e.g.*, provide content to a user via a display on the user's mobile device) (1) upon receiving an indication of a voice call (such as a dialed number), (2) during an ongoing voice call, and/or (3) after ending the voice connection. EX-1004 [0029]-[0030]. For example, Roundtree describes that a user may call a party to place an order for an item, and the system may end the voice call and establish a data connection between the user and the called party in order for the called party to provide displayable content to the user to enable the user to place an order. EX-1004 [0032]. Further, Roundtree discloses that its

system enables call interception methods to provide data services to voice calls having such capabilities, such as visually displayed content to a user [*a method of controlling presentation of content on a communication device*]. EX-1004 [0066].

[1.1] upon receipt of notification of initiation of a communication connection from a first device associated with a first party to a second device associated with a second party:

106. Roundtree discloses this limitation. Roundtree discloses receiving an indication of an initiated voice call, such as a user of a first device associated with a first party dialing a phone number of a second device associated with a second party [*upon receipt of notification initiation of a communication connection from a first device associated with a first party to a second device associated with a second party*]. EX-1004 [0029], [0073]; FIG. 9. Roundtree discloses a number of examples describing an action triggered upon this receipt of an indication of an initiated voice call (*e.g.*, dialed phone number) such as, for example, determining if the dialed number supports data services and, if so, providing data services (including displayable content) to the calling party and/or called party over a data connection. EX-1004 [0029]-[0030], [0056]-[0058], [0062]-[0063].

[1.2] pausing establishment of the communication connection without soliciting action by the first party; and during said pausing, transmitting selected content toward the first device and/or the second device; and

107. Roundtree discloses several examples of this limitation. I note that the Specification for the '303 Patent does not use the word "pausing" (or "pause") apart from the claims. I also note that these words were included in the claims when the Applicant filed the application that led to the '303 Patent in October 2019, but were not included, for example, in the claims of a continuation application to which the '303 Patent claims priority (U.S. Patent No. 9,819,812). EX-1001 pp. 1-2 (fields numbered (22),(63)); EX-1002, 184-189. Instead, the '303 Patent uses the word "delay" and "delaying" when it describes "delaying" the voice connection to allow call processing, such as in order to determine and present the called party's status, to retrieve content to be presented, to allow the caller to review content or to choose an alternate course of action if the called party is not currently available, or for some other reason. EX-1001 12:1-6.

108. Roundtree discloses the identical concept as the '303 Patent, but does not use the word "pausing" or "delaying." Instead, Roundtree describes intercepting a call to determine whether to provide enhanced content to the calling party and/or called party. Roundtree includes a broad disclosure that before, during, or after completion of a voice call, it can determine if the voice call is to be

enhanced. EX-1004 [0055], [0073]. Like the '303 Patent, Roundtree uses the word completion of a voice call to mean the voice connection has been established. EX-1004 [0050], [0054]-[0055]. Thus, when Roundtree describes that the system determines whether the voice call is to be enhanced “before, [or] during... completion” of the call, this is during the time period after the system intercepts an initiated telephone call (*e.g.*, phone number dialed) but before the voice connection is made [*upon receipt...([1.1]) pausing establishment of the communication connection without soliciting action by the first party*]. EX-1004 [0055].

109. FIG. 6A (which I reproduce below) illustrates an example of a routine for intercepting and displaying content on a calling party’s mobile device upon receiving an indication of a user initiated voice call (*e.g.*, dialed phone number) and before establishment of a voice communication connection with a called party.

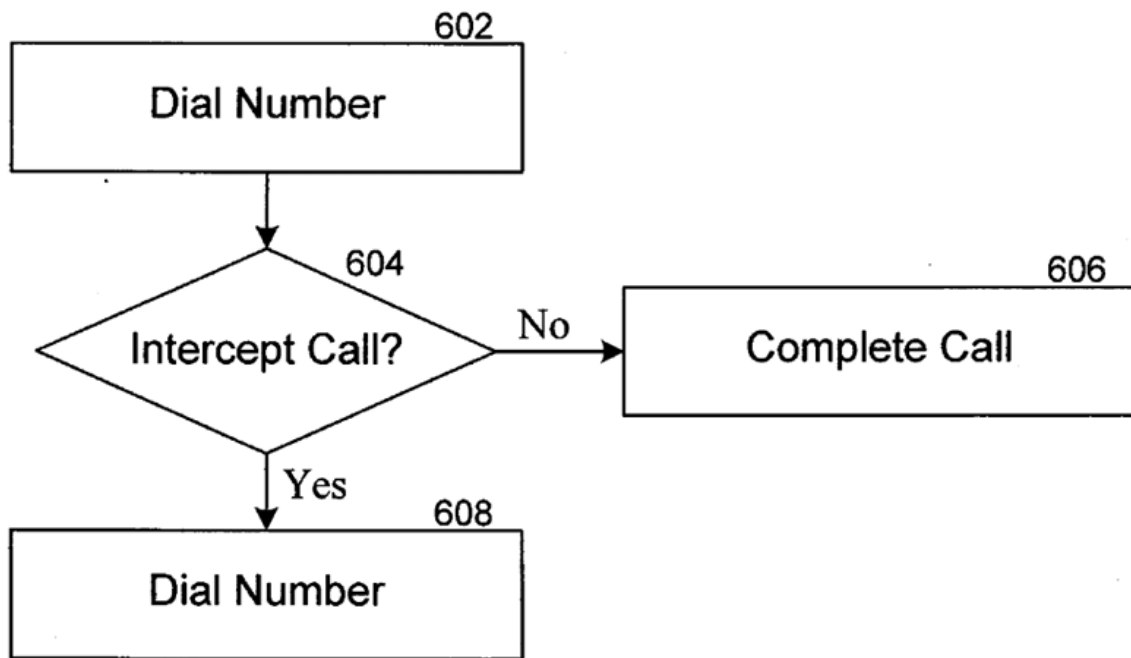


FIG. 6A

110. In block 602, a subscriber dials a customer service support number, such as “611” to access a customer support call center. The subscriber’s mobile device determines locally if the number dialed matches a number stored on the mobile device (block 604). If the number matches, then the mobile device locally intercepts the customer service support call at the mobile device and performs actions at the mobile device (block 608). In one embodiment, the mobile device may intercept the incoming call and display locally stored content (e.g., series of help screens), or launch a browser to a predetermined webpage via a network

connection.¹ If the number does not match, then the mobile device allows the call to be completed to a call center (block 606). EX-1004 [0050]. Roundtree further describes that, upon receiving an indication of a user-initiated voice call (*e.g.*, dialed phone number) and before a voice call is connected, the voice call can be intercepted, and Roundtree describes several different methods for determining whether the dialed number supports enhanced data capabilities. EX-1004 [0055]-[0062]. Specifically, Roundtree describes that before, during, or after completion of the voice call, as in block 712, the system, in block 720, decides if the voice call is to be enhanced. The system proceeds through some or all of a number of different methods, such as in block 722, in determining whether or not to enhance a call. EX-1004 [0055], FIGS. 7A-7B.

111. Thus, Roundtree discloses that, upon receiving an indication of a voice call (such as a dialed number), intercepting the voice call to determine if the dialed number is associated with enhanced data services, and if so, providing the

¹ Block 608 in FIG 6A (which I reproduce above) recites “Dial Number” (which is the same words recited inside block 602); however, the corresponding text for block 608 in EX-1004 [0050] (which I also reproduce above) specifies that block 608 is where actions are performed at the mobile device such as display locally stored content or launch a browser to a predetermined webpage.

enhanced data services to a calling party user of a mobile device before a voice call is connected [*pausing establishment of the communication connection without soliciting action by the first party and during said pausing, transmitting... content toward the first device*]. EX-1004 [0029], [0052]-[0054], [0066], Claim 9.

Roundtree further discloses, if the voice call supports data services, displaying the enhanced services to the first party without requiring user input. The system may download or otherwise obtain content from a local database and one or more remote databases. EX-1004 [0063], [0056]-[0058].

112. I note that the claimed “selected content”, that is “transmitt[ed]... toward the first device and/or the second device” during “said pausing” (as recited in limitation [1.2]), must include “information regarding a previous transaction between the first party and the second party” (as recited in limitation [1.4]).

Roundtree discloses several examples of these limitations.

113. In a customer service call center example, Roundtree describes that a call center may contain a database relating unique identifiers for mobile devices and corresponding status or other reporting information. Upon receipt of a dialed number and appended unique identifier for the calling subscriber’s mobile device at the customer service call center, the system is able to match the received unique identifier with a similar stored unique identifier and retrieve information about the subscriber’s mobile device from a database. The retrieved information from the

database may be diagnostic information retrieved from, or received from, the subscriber's mobile device during previous calls with the customer service call center [*wherein the selected content comprises information regarding a previous transaction between the first party and the second party (see limitation [1.4] below)*]. EX-1004, [0082]-[0083], [0088]-[0090].

114. For example, Roundtree discloses that, while on a call with a subscriber, in order to quickly correct issues during the call and without having to ask the subscriber to call back on a land line, a called customer service call center agent can, from his or her desktop computer, send diagnostic commands over the air to a calling subscriber's mobile device and, in response, the mobile device retrieves or gathers diagnostics and status information and sends them back to the agent's computer, via the network. EX-1004 [0089]. Roundtree discloses that, for each of these subscriber-call center transactions, the system records how issues with a subscriber's mobile device were resolved by the call center (EX-1004, [0088]), and the system relates the transmitted information (from the subscriber's mobile device) to the unique identifier of the subscriber's mobile device and stores the information in the database. EX-1004, [0082], [0090] ("report and history portion... the history of the handset"). Roundtree explains that customer service calls may be shorter and more effective as a result of representatives receiving information from the user identifiers, as they may be able to diagnose problems

without receiving much information from users. For example, a service provider may modify or selectively determine what information to retrieve upon receipt of a unique identifier. They may use historical information about previous calls, historical information about the device or caller, or may determine the information most useful to their representatives. EX-1004 [0083].

115. Thus, as I discussed in paragraphs 113-114 above for a customer service call center example, Roundtree discloses that, upon receipt of a unique identifier of a mobile device of a calling subscriber [*first party*], and before a voice conversation occurs, the system enables a representative at a called customer service center [*second party*] to receive, and display on the representative's computer [*second device*], dynamically or recently updated information about the characteristics or status of the calling subscriber's mobile device (and/or associated calling subscriber) (including historical information about previous calls with the subscriber) [*pausing establishment of the communication connection without soliciting action by the first party and during said pausing, transmitting selected content toward... the second device... wherein the selected content comprises information regarding a previous transaction between the first party and the second party (see limitation [1.4] below)*]. EX-1004 [0082]-[0083], [0088] (“system may... resolve handset issues and record how the matter was resolved”, which a POSITA would understand to be “record[ed]” in the database described in

[0082] as “historical information about [a] previous call” described in [0083]), [0089] (describing information transmitted between parties to resolve subscriber handset issues during a call and that a POSITA would understand would be stored in the database described in [0082] as “historical information about [a] previous call” described in [0083]), [0090] and FIG. 13 (describing customer service display 13, on the call center agent’s computer, as including a “report and history portion”, “tab... display[ing] the history of the handset” which a POSITA would understand to be retrieving information from the database described in [0082])).

116. In another example, Roundtree describes enabling a user to place an order for an item from a second party (*e.g.*, a pizza restaurant). The calling customer [*first party*] is able to place the order via the first device, such as via a display on the first device, send data about the order to the pizza restaurant [*second party*], and receive, from the second party, details of the transaction (*e.g.*, the user’s order, status of the ordered pizza, pizza delivery status). Roundtree describes this type of data can be exchanged as displayable content, between the first party and the second party, and further describes that the “displays” from the recently completed transaction can be saved depending on user preferences, which, in my opinion, a POSITA understood to mean, depending on user preferences, saving the content that was displayed (*e.g.*, saving “order details” (“one large

pepperoni pizza with extra sauce”) for the recently completed transaction as shown in FIG. 8C). EX-1004 [0032], [0071].

117. Additionally, in its pizza example, Roundtree describes that the system may encode a token in the dialing string for the calling party’s favorite pizza delivery establishment that indicates that the following dialed inputs are part of an enhanced data link identification, *e.g.*, a dialed string such as 1-800-749-9263*669 may relate to retrieving enhanced content from URL http://www.18007499263*669. EX-1004, [0069], [0067]. And, in its pizza example, Roundtree describes that the system may use some or all of the enhanced number lookup methods discussed herein (EX-1004 [0068]), which, in my opinion, a POSITA would understand to include, for example, using the architecture described in FIG. 6A (EX-1004 [0050]), the calling customer’s mobile device intercepting the user’s telephone call to the pizza restaurant and, before a voice connection is made, launching a browser to the predetermined “http://www.18007499263*669” webpage via a data network connection that displays, based on the calling customer’s preferences, the customer’s previous orders for pizza from this restaurant to allow the calling party to select a pizza to reorder [*pausing establishment of the communication connection without soliciting action by the first party and during said pausing, transmitting selected content toward the first device... wherein the selected content comprises information*

regarding a previous transaction between the first party and the second party (see limitation [1.4] below)]. EX-1004 [0067]-[0069], [0071], [0082]-[0083] (“the system may contain a database relating unique identifiers for mobile devices and corresponding... information about the mobile device” such as “historical information about previous calls.”).

[1.3] after one of the first party and the second party terminates the communication connection, transmitting additional content toward the first device and/or the second device;

118. Roundtree discloses several examples of this limitation. I note that the claimed “additional content”, that is “transmitt[ed]... toward the first device and/or the second device” “after one of the first party and the second party terminates the communication connection” (as recited in limitation [1.3]), must include “information regarding a new transaction conducted between the first party and the second party during the communication connection” (as recited in limitation [1.5]). Roundtree discloses several examples of these limitations.

119. In its pizza example, Roundtree describes that, after the calling customer [*first party*] or the called pizza restaurant [*second party*] ends the voice call, the pizza restaurant’s employee may transmit, over a data connection, details of the new pizza-ordering transaction conducted over the recently terminated voice connection between the calling customer and called pizza restaurant (*i.e.*, the

customer's order, status of the ordered pizza ("in preparation", "transaction complete"), and delivery status ("in transit", "delivered")), which are displayed on the customer's mobile device after receipt [*after one of the first party and the second party terminates the communication connection, transmitting additional content toward the first device... wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection (see limitation [1.5] below)*]. EX-1004 [0071].

120. Additionally, in a customer service call center example, in my opinion, a POSITA understood Roundtree discloses that, after an agent of the called customer service call center "correct[ed] issues" with a calling subscriber's mobile device ("handset") "[w]hile on a call with [the] subscriber" (EX-1004 [0089]), "[t]he system... record[ed] how the matter was resolved" in a database relating unique identifiers for mobile devices and corresponding status or other information about the mobile device (EX-1004 [0088], [0082]), and after the voice connection of the call is terminated, the call center agent may retrieve information regarding this recently completed transaction from the database, and via the network, using the agent's computer [*second device*] and, after receipt, display such information on such computer (*e.g.*, EX-1004 [0090], FIG. 13 "report and history portion", "tab... display[ing] the history of the handset") [*after one of the*

first party and the second party terminates the communication connection, transmitting additional content toward... the second device... wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection (see limitation [1.5] below)]. EX-1004 [0082], [0088]-[0090], FIG. 13.

121. Roundtree also describes, with reference to FIG. 6B, for intercepted calls routed to a customer service call center, the subscriber's mobile device may retrieve data or scripts from the network to address the subscriber's support issue and, if the call center determines no more items need to be processed, then the subscriber's call ends. EX-1004 [0051]-[0052]. Additionally, Roundtree describes that, with reference to FIG. 9, the system may execute a script associated with the dialed number (*e.g.*, customer service call center), the script may then end the voice call and begin displaying content to the user, and the script may output text, images or other content to a display screen of the user's device. EX-1004 [0074]. And, Roundtree describes, with reference to FIG. 7A, for intercepted voice calls supporting data services (*e.g.*, to a customer service call center), the system may download or otherwise obtain content from remote databases via a network, display content stored in one or more remote databases, and "may proceed from block 716 (when the system ends the voice call) directly to block 750 (when the system decides to continue... displaying enhanced data services)." EX-1004

[0063]-[0065]. Accordingly, in my opinion, Roundtree discloses to a POSITA that, after the voice connection between a calling subscriber and a called customer service call center agent is terminated, a subscriber may download information regarding how his/her handset issue was resolved during the now-terminated call with the customer service call center from a remote database and, after receipt, display it on the handset *[after one of the first party and the second party terminates the communication connection, transmitting additional content toward the first device... wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection (see limitation [1.5] below)]*. EX-1004 [0088]-[0089], [0051]-[0052], [0063]-[0065], [0074].

[1.4] wherein the selected content comprises information regarding a previous transaction between the first party and the second party;

122. Roundtree discloses several examples of this limitation. As I described above with respect to limitation [1.2] for one of Roundtree's customer service call center examples, Roundtree discloses that, upon receipt of a unique identifier of a mobile device of a calling subscriber *[first party]*, and before a voice conversation occurs, the system enables a representative at a called customer service center *[second party]* to select and retrieve, from a database and via a data network connection, and display on the representative's computer *[second device]*,

dynamically or recently updated information about the characteristics or status of the calling subscriber's mobile device (and/or associated calling subscriber), including historical information about previous calls with the subscriber such as records of how issues with the subscriber's mobile device were previously resolved by the call center and diagnostic information received from the subscriber's mobile device during previous calls with the customer service call center [*wherein the selected content comprises information regarding a previous transaction between the first party and the second party*]. EX-1004, [0082]-[0083]; *see also* paragraphs 114-115 above in my discussion of limitation [1.2] (*citing* EX-1004, [0088] ("system may... resolve handset issues and record how the matter was resolved", which a POSITA would understand to be "record[ed]" in the database described in [0082] as "historical information about [a] previous call" described in [0083]), [0089] (describing information transmitted between parties to resolve subscriber handset issues during a call and that a POSITA would understand would be stored in the database described in [0082] as "historical information about [a] previous call" described in [0083])).

123. As I described above with respect to limitation [1.2] for Roundtree's pizza example, Roundtree describes that the displays from the recently completed pizza ordering transaction can be saved depending on user preferences, which, in my opinion, a POSITA understood to mean, depending on user preferences, saving

the content that was displayed (*e.g.*, saving “order details” (“one large pepperoni pizza with extra sauce”) for the recently completed transaction as shown in FIG. 8C). EX-1004 [0071]. As I also described above with respect to limitation [1.2] for Roundtree’s pizza example, Roundtree describes that the system may encode a token in the dialing string for the calling customer’s favorite pizza delivery establishment that indicates that the following dialed inputs are part of an enhanced data link identification, *e.g.*, a dialed string such as 1-800-749-9263*669 may relate to retrieving enhanced content from URL http://www.18007499263*669. EX-1004, [0069], [0067]. And, as I further described above with respect to limitation [1.2] for Roundtree’s pizza example, Roundtree describes that the system may use some or all of the enhanced number lookup methods discussed in Roundtree (EX-1004 [0068]), which, in my opinion, a POSITA would understand to include, for example, using the architecture described in FIG 6A (EX-1004 [0050]), the calling customer’s mobile device intercepting the user’s telephone call to the pizza restaurant and, before a voice connection is made, launching a browser to the predetermined “http://www.18007499263*669” webpage via a data network connection that displays, based on the calling customer’s preferences, the customer’s saved previous orders for pizza from this restaurant to allow the calling customer to select a pizza to reorder [*wherein the selected content comprises information regarding a previous transaction between the first party and the*

second party]. EX-1004 [0067]-[0069], [0071], [0050], [0082]-[0083] (“the system may contain a database relating unique identifiers for mobile devices and corresponding... information about the mobile device” such as “historical information about previous calls.”). In my opinion, a POSITA understood that Roundtree teaches that previous orders for pizza placed by the user would be stored in a database, and accessible and displayable on the calling customer’s mobile device via the “http://www.18007499263*669” webpage, as historical information about previous calls. *Id.*; EX-1004 [0083].

[1.5] wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection; and

124. Roundtree discloses several examples of this limitation. As I described above with respect to limitation [1.3] for Roundtree’s pizza example, the content specifically described by Roundtree in this example as being transmitted and displayed to the customer calling party [*first party*] includes, after “end[ing] the voice call”, content “based on status of the user’s order (such as provid[ing] a display showing the order as ‘in preparation,’ in transit, ‘delivered,[’] ‘transaction complete,’ and so on).” EX-1004 FIG. 8C, [0071]. Accordingly, Roundtree discloses in this pizza example, that, after “end[ing] the voice call”, the pizza restaurant’s employee may transmit, over a data connection, details of the new

pizza-ordering transaction conducted over the now-terminated voice connection between the calling customer [*first party*] and called pizza restaurant [*second party*] (*i.e.*, the customer's order, status of the ordered pizza, and delivery status) [*wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection*], which are displayed on the customer's mobile device [*first device*] after receipt. *Id.*

125. As I described above with respect to limitation [1.3] for one of Roundtree's customer service call center examples, in my opinion, a POSITA understood Roundtree discloses that, after an agent of the called customer service call center [*second party*] "correct[ed] issues" with a calling subscriber's [*first party's*] mobile device ("handset") "[w]hile on a call with [the] subscriber" (EX-1004 [0089]), "[t]he system... record[ed] how the matter was resolved" in a database relating unique identifiers for mobile devices and corresponding status or other information about the mobile device (EX-1004 [0088], [0082]), and after the voice connection of the call is terminated, the call center agent may retrieve information regarding this recently completed transaction from the database, and via the network, using the agent's computer [*second device*] and, after receipt, display such information on such computer (*e.g.*, EX-1004 [0090], FIG. 13 "report and history portion", "tab... display[ing] the history of the handset") [*wherein the*

additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection]. EX-1004 [0082], [0088]-[0090], FIG. 13.

126. As I also described above with respect to limitation [1.3] for one of Roundtree's customer service call center examples, Roundtree describes, with reference to FIG. 6B, for intercepted calls routed to a customer service call center, the subscriber's mobile device may retrieve data or scripts from the network to address the subscriber's support issue and, if the call center determines no more items need to be processed, then the subscriber's call ends. EX-1004 [0051]-[0052]. Additionally, Roundtree describes, with reference to FIG. 9, that, the system may execute a script associated with the dialed number (*e.g.*, customer service call center), the script may then end the voice call and begin displaying content to the user, and the script may output text, images or other content to a display screen of the user's device. EX-1004 [0074]. And, Roundtree describes, with reference to FIG. 7A, for intercepted voice calls supporting data services (*e.g.*, to a customer service call center), the system may download or otherwise obtain content from remote databases via a network, display content stored in one or more remote databases, and "may proceed from block 716 (when the system ends the voice call) directly to block 750 (when the system decides to continue... displaying enhanced data services)." EX-1004 [0063]-[0065]. Accordingly, as I described

above with respect to limitation [1.3], in my opinion, Roundtree discloses to a POSITA that, after the voice connection between a calling subscriber and a called customer service call center agent is terminated, a subscriber may download information regarding how his/her handset issue was resolved during the now-terminated call with the customer service call center [*wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection*] from a remote database and, after receipt, display it on the subscriber's handset [*first device*]. EX-1004 [0088]-[0089], [0051]-[0052], [0063]-[0065], [0074].

[1.6] wherein the first device and/or the second device display the additional content after receipt.

127. As I described above with respect to limitation [1.5], in Roundtree's pizza example, Roundtree discloses that the calling customer's mobile device [*first device*] displays the additional content after receipt. EX-1004 [0071]. And, as I described above with respect to limitation [1.5], in Roundtree's customer service call center examples, Roundtree discloses to a POSITA that the computer of the call center agent that resolved issues with the calling subscriber's handset in the recently completed transaction conducted during the now-terminated voice connection of the call [*second device*], and/or the calling subscriber's handset [*first device*], display the additional content after receipt. EX-1004 [0082], [0088]-[0090], FIG. 13, [0051]-[0052], [0063]-[0065], [0074].

Claim 2

[2.0] The method of claim 1,

[2.1] wherein pausing establishment of the communication connection comprises: transmitting to the first device a signal indicating that the communication connection should be paused;

128. Roundtree discloses this limitation. As shown in FIG. 12, the subscriber [*first party*] first dials a number on the mobile device (block 1201). If the dialed number matches a number stored on the mobile device [*first device*], then the SIM card on the mobile device intercepts [*pausing establishment of the communication connection (see my analysis of limitation [1.2] above)*] and redirects the call to the mobile device (block 1802) using SMS, supplementary service control strings, network and mobile device based control commands, and others. EX-1004 [0085]. Roundtree discloses that the SIM card may send a command via SMS or other protocol to the mobile device to launch a support application or launch a browser to a URL in order to provide enhanced content to the mobile device [*transmitting to the first device a signal indicating that the communication connection should be paused*]. EX-1004 [0086]. Thus, in my opinion, a POSITA understood that Roundtree discloses intercepting the establishment of the communication connection in order to provide enhanced content to the mobile phone, thus delaying the communication connection. EX-1004 [0085]-[0086]; *see also* my analysis of limitation [1.2] above.

[2.2] wherein, in response to receipt of the signal, the first device initiates a delay in establishing the communication connection.

129. As I described above with respect to limitation [2.1], Roundtree discloses that the mobile device runs a script, and launches a support application or browser in response to the command from the SIM card, which delays establishing the communication connection *[wherein, in response to receipt of the signal, the first device initiates a delay in establishing the communication connection]*. EX-1004 [0085]-[0086].

Claim 3

[3.0] The method of claim 1,

[3.1] wherein: the communication connection is a call; and

130. Roundtree discloses initiating a *call* by the user of a first device associated with a first party dialing a phone number of a second device associated with a second party. EX-1004 [0073]; FIGS. 6, 7A, 9, 12; *see also* my analysis of limitations [1.0], [1.1] above (receiving an indication of an initiated voice call).

[3.2] pausing establishment of the communication connection comprises instructing the first device to delay completion of dialing of the call.

131. Roundtree discloses this limitation. As shown in FIG. 12, the subscriber first dials a number on the mobile device (block 1201). If the dialed number matches a number stored on the mobile device, then the SIM card on the

mobile device intercepts [*pausing establishment of the communication connection* (see my analysis for limitation [1.2] above)] and redirects the call to the mobile device (block 1802) using SMS, supplementary service control strings, network and mobile device based control commands, and others. EX-1004 [0085].

Roundtree discloses that the SIM card may send a command via SMS or other protocol to the mobile device to launch a support application or launch a browser to a URL in order to provide enhanced content to the mobile device [*instructing the first device to delay completion of dialing of the call*]. EX-1004 [0086]. Thus, in my opinion, a POSITA understood that Roundtree discloses intercepting the establishment of the communication connection in order to provide enhanced content to the mobile phone, thus instructing the mobile device to delay completion of dialing the call. EX-1004 [0085]-[0086].

Claim 4

[4.0] The method of claim 1,

[4.1] wherein pausing establishment of the communication connection comprises: transmitting to a call server associated with the first device a signal indicating that the communication connection should be paused;

132. Roundtree discloses this limitation. Roundtree discloses that, when a call placed by a mobile device is to a customer support call center (of which the calling party is a subscriber), the call center may use an interactive voice

recognition system (IVRS) to determine if the subscriber's call should be intercepted. EX-1004, [0053], [0051]. Specifically, Roundtree discloses:

Alternatively, as described below, the call may be routed to the call center or an interactive voice response system (IVRS), and then bounced back to the mobile device... In an alternative embodiment, the call center determines if the subscriber's call should be intercepted and directs the call accordingly. The call center may utilize an IVRS (Interactive Voice Recognition System) to communicate with the subscriber. If the call center determines that the call should not be intercepted, then the call is allowed to continue through the call center for processing (block 614). If the call center determines that the call should be intercepted, then the call is redirected back to the mobile device for local processing (block 620). Thus, if the call goes through to the call center/IVRS, and then is routed back to the mobile device, the call to the call center may include[] access information to facilitate routing a message back to the mobile device via SMS, USSD or other network signaling technologies. The call center employs a software application to direct mobile equipment, so that it automatically processes requests it receives from mobile devices.

EX-1004, [0053], [0051]. Accordingly, in an embodiment, Roundtree discloses that the call center utilizes the IVRS to communicate with the subscriber, whereby the call would be routed to the IVRS (and not to the customer support call center) to determine whether the call should be intercepted (*e.g.*, by determining whether the call should be routed back to the mobile device from the IVRS in order to, for

example, display locally stored content or launch a browser to a predetermined web page). EX-1004, [0053], [0051], [0050]. Roundtree also discloses that the call center includes a software application, running on a processor, which, in my opinion, a POSITA understood to be a call server. EX-1004, [0053], FIG. 2, [0035]. Roundtree further discloses that a function of the call center call server is to direct mobile equipment. *Id.*.

133. Accordingly, in my opinion, Roundtree discloses to a POSITA that the IVRS transmits a signal to the call center call server containing information indicating that the call should be intercepted (*e.g.*, information indicating that the call should be routed back to the mobile device from the IVRS in order to, for example, display locally stored content or to launch a browser to a predetermined web page) and, if the call center call server determines that the call should be intercepted in response to receiving the information in the IVRS signal, then the call server redirects the call back to the mobile device from the IVRS for local processing (block 620) [*wherein pausing establishment of the communication connection comprises: transmitting to a call server ... a signal indicating that the communication connection should be paused*]. EX-1004 [0053], [0051], [0050]; *see also* my analysis of limitation [1.2] above. In my opinion, a POSITA would also understand that, since Roundtree discloses that the calling party is a subscriber of the called customer support call center's services (including enhanced data

services for the subscriber's mobile device [*first device*]), Roundtree's call center call server is "*associated with the first device.*" EX-1004 [0053], [0051].

[4.2] wherein, in response to receipt of the signal, the call server initiates a delay in completing the establishment of the communication connection.

134. Roundtree discloses this limitation because, as I described above for limitation [4.1], in response to the call center call server's receipt of the information in the IVRS signal, the call server redirects the call back to the mobile device from the IVRS for local processing (*e.g.*, to display, as I described above for limitation [4.1], locally stored content or to launch a browser to a predetermined web page). EX-1004 [0053], [0051], [0050]. Thus, by routing the subscriber's call back to the mobile device from the IVRS, which is done in response to the call center call server's receipt of the information in the IVRS signal, the call server initiates a delay in completing the establishment of a voice connection between the subscriber and the customer support call center [*in response to receipt of the signal, the call server initiates a delay in completing the establishment of the communication connection*]. EX-1004 [0053], [0051].

Claim 5

[5.0] The method of claim 1, wherein:

[5.1] the communication connection is a call; and

135. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [3.1].

[5.2] pausing establishment of the communication connection comprises instructing a call server associated with the first device to delay signaling of the call toward the second device.

136. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitations [4.1]-[4.2]. In my opinion, a POSITA understood that the IVRS signal to the call center call server (and the information contained therein) is effectively *instructing a call server associated with the first device to delay signaling of the call toward the second device*, because the received signaling information results in a determination that the voice call should be intercepted, and causes the call server to further delay signaling of the call toward the called customer service call center device [*second device*] by re-directing the call back to the mobile device from the IVRS for local processing (*e.g.*, to display locally stored content or launch a browser to a predetermined web page, as I described above for limitation [4.1]). EX-1004 [0053], [0051], [0050].

Claim 6

The method of claim 1, wherein the selected content is selected by the first party.

137. Roundtree discloses this limitation. As I noted above regarding limitations [1.2] and [1.4], the claimed “selected content” must be “transmitt[ed]... toward the first device and/or the second device” during “said pausing” (as recited in limitation [1.2]), and must include “information regarding a previous transaction between the first party and the second party” (as recited in limitation [1.4]).

138. For example, as I described above with respect to limitations [1.2] and [1.4] for Roundtree’s pizza example, in my opinion, Roundtree discloses to a POSITA that the selected content on the predetermined “http://www.18007499263*669” webpage, that is stored in a database, and accessible and displayable via a data network connection before a voice connection is made between the calling customer and called pizza restaurant, – *i.e.*, the customer’s saved previous orders for pizza from this restaurant – is based on the calling customer’s preferences [*wherein the selected content is selected by the first party*]. EX-1004 [0067]-[0069], [0071], FIG. 8C, [0050]-[0052] (FIG. 6A). In my opinion, a POSITA would understand that claims 1, 6 and 7 do not specify a time limit between when the selected content is selected by a party and when the selected content is transmitted toward a party’s device.

Claim 7

The method of claim 1, wherein the selected content is selected by the second party.

139. Roundtree discloses this limitation. As I noted above regarding limitations [1.2] and [1.4], the claimed “selected content” must be “transmitt[ed]... toward the first device and/or the second device” during “said pausing” (as recited in limitation [1.2]), and must include “information regarding a previous transaction between the first party and the second party” (as recited in limitation [1.4]).

140. For example, as I discussed above with respect to limitations [1.2] and [1.4], in one of Roundtree’s customer service call center examples, Roundtree discloses that calls to a customer service call center include a user identifier which the call center agent [*second party*] can use to determine what information to retrieve and display upon receipt of a unique identifier of a calling subscriber’s mobile device (and before a voice connection is made), including dynamically or recently updated information about the characteristics or status of the calling subscriber’s mobile device (and/or associated calling subscriber), including historical information about previous calls with the subscriber such as records of how issues with the subscriber’s mobile device were previously resolved by the call center and diagnostic information received from the subscriber’s mobile device during previous calls with the customer service call center [*wherein the selected content is selected by the second party*]. EX-1004 [0082]-[0083], [0088]

(“system may... resolve handset issues and record how the matter was resolved”, which a POSITA would understand to be “record[ed]” in the database described in [0082] as “historical information about [a] previous call” described in [0083]), [0089] (describing information transmitted between parties to resolve subscriber handset issues during a call and that a POSITA would understand would be stored in the database described in [0082] as “historical information about [a] previous call” described in [0083]); FIG. 13 and [0090] (describing customer service display 13, on the call center agent’s computer, as including a “report and history portion”, “tab... display[ing] the history of the handset” which a POSITA would understand to be retrieving information from the database described in [0082])).

Claim 8

The method of claim 1, wherein the selected content is selected by a call controller operating in a path of communication between the first device and the second device.

141. Roundtree discloses this limitation. The '303 Patent discloses that the “call controller” controls presentation of content to the mobile phone and is also known as a call server. EX-1001 12:9-11.

142. Roundtree discloses that, if the call center determines the initiated voice call – *i.e.*, intercepted call for which the voice connection is not yet established/completed – supports data services, the system displays the enhanced services to the mobile device. The system may check for content and may

download or otherwise obtain content and display content from local or remote databases [*wherein the selected content is selected by a call controller operating in a path of communication between the first device and the second device*]. EX-1004 [0063]; *see also* my analysis of limitations [1.2] and [1.4] (including examples of “selected content”). Roundtree also discloses that the call center includes a software application running on a processor, which the ’303 Patent refers to as a call controller, and that a function of the software application is to direct mobile devices, including the routing of a call from and back to a mobile device without, for example, establishing a voice connection between a calling subscriber’s mobile device [*first device*] and a call center agent’s computer [*second device*]. EX-1004 [0053], [0051], FIG. 2, [0035]. Thus, in my opinion, a POSITA understood that the call center includes a *call controller*. *Id.*

Claim 9

The method of claim 1, wherein the selected content is displayed one or more of: during said pausing; after the communication connection is established; and after the communication connection is terminated.

143. Roundtree discloses this limitation for the same reasons that I discussed above with respect to limitations [1.2] and [1.4]. I note that this limitation only requires that “the selected content” be displayed at one (1) of the three (3) time periods recited in claim 9, as it recites “one **or** more of.” Roundtree discloses providing enhanced data services to the first device before, during, or

after completion of a voice call, and after terminating a completed voice call, which encompasses each of the three recited time periods. EX-1004 [0055], [0072], [0073]-[0074].

144. As I discussed above with respect to limitations [1.2] and [1.4], in a customer service call center example, Roundtree discloses that, upon receipt of a unique identifier of a mobile device of a calling subscriber [*first party*], and before a voice conversation occurs [*during said pausing*], the system enables a representative at a called customer service center [*second party*] to retrieve, from a database and via a data network connection, and display on the representative's computer [*second device*], the selected content (historical information about previous calls with the subscriber) [*wherein the selected content is displayed... during said pausing*]. EX-1004, [0082]-[0083], [0088] (“system may... resolve handset issues and record how the matter was resolved”, which a POSITA would understand to be “record[ed]” in the database described in [0082] as “historical information about [a] previous call” described in [0083]), [0089] (describing information transmitted between parties to resolve subscriber handset issues during a call and that a POSITA would understand would be stored in the database described in [0082] as “historical information about [a] previous call” described in [0083]); FIG. 13 and [0090] (describing customer service display 13, on the call center agent's computer, as including a “report and history portion”, “tab...

display[ing] the history of the handset” which a POSITA would understand to be retrieving information from the database described in [0082])). In my opinion, a POSITA would also understand that Roundtree discloses displaying (and/or continuing to display) the selected content (historical information about previous calls with the subscriber) on the call center representative’s computer [*second device*] after establishment/completion of the voice call between the subscriber and the call center representative [*wherein the selected content is displayed... after the communication connection is established*] so that an established customer service call is shorter and more effective. EX-1004 [0083]; FIG. 13 and [0090] (describing customer service display 13, on the call center agent’s computer, as including a “report and history portion”, “tab... display[ing] the history of the handset” which a POSITA would understand to be retrieving information from the database described in [0082])).

145. As I also discussed with respect to limitations [1.2] and [1.4] above, in the pizza example, in my opinion, Roundtree discloses to a POSITA that the selected content – *i.e.*, the calling customer’s saved previous orders for pizza from the called pizza restaurant – would be stored in a database, and accessible and displayable on the calling customer’s mobile device [*first device*], before a voice connection is made between the calling customer and called pizza restaurant, via the “http://www.18007499263*669” webpage, as historical information about

previous calls [*wherein the selected content is displayed... during said pausing*] to allow the calling customer to select a pizza to reorder. EX-1004 [0067]-[0069], [0071], [0050]-[0052] (FIG. 6A), [0083]. In my opinion, a POSITA would also understand that Roundtree discloses displaying (and/or continuing to display) the selected content (the calling customer's saved previous orders for pizza from the called pizza restaurant) on the customer's mobile device [*first device*] after establishment/completion of the voice call between the customer and the restaurant [*wherein the selected content is displayed... after the communication connection is established*] so that an established voice call to reorder a pizza is shorter and more effective. *Id.*

Claim 10

The method of claim 1, wherein the selected content further comprises information regarding a prospective new transaction between the first party and the second party.

146. As I noted above regarding limitations [1.2] and [1.4], the claimed “selected content” must be “transmitt[ed]... toward the first device and/or the second device” during “said pausing” (as recited in limitation [1.2]), and must include “information regarding a previous transaction between the first party and the second party” (as recited in limitation [1.4]). Claim 9 recites that the claimed “selected content” must further include “information regarding a prospective new

transaction between the first party and the second party.” Roundtree discloses several examples for this limitation.

147. For example, Roundtree discloses in FIGS. 5 and 6A, a calling subscriber [*first party*] can contact customer service support by dialing “611” (e.g., block 602). EX-1004, [0049], [0050]. The subscriber’s mobile device determines locally if the number dialed matches a number stored on the mobile device (block 604). If the number matches, then the mobile device locally intercepts the customer service support call at the mobile device – *i.e.*, before a voice connection is established between the calling subscriber and a customer service call center agent – and displays locally stored content (e.g., series of help screens), or launches a browser to a predetermined webpage via a network connection [*wherein the selected content further comprises information regarding a prospective new transaction between the first party and the second party*]. EX-1004, [0049], [0050]. For example, as shown in FIG. 5, the display 504 may automatically provide the calling subscriber, before a voice connection is established between the calling subscriber and a customer service call center agent, with a list of top issues or questions 500, which may answer common customer support questions [*prospective new transaction between the first party and the second party*]. Subscribers can scroll down on the display 504 using a more options button 508 to view additional issues. Subscribers can select an issue from the list using a select

button 506. Selecting an issue allows the mobile device 100 to retrieve relevant data from the local, programmable non-volatile memory 116 [*wherein the selected content further comprises information regarding a prospective new transaction between the first party and the second party*]. EX-1004 [0049].

148. As another example, as shown in FIG. 12, the subscriber first dials a number on the mobile device (block 1201). If the dialed number matches a number stored on the mobile device (*e.g.*, for a customer service call center), then the SIM card on the mobile device intercepts [*i.e.*, before a voice connection is established between the calling subscriber and a customer service call center agent, *see my analysis for limitation [1.2] above*] and redirects the call to the mobile device (block 1802). EX-1004 [0085]. Roundtree discloses that the SIM card may send a command to the mobile device to launch a support application on the device, which may locally perform diagnostic scripts on the mobile device to gather user, device, and network data [*information regarding a prospective new transaction between the first party and the second party*], which may be displayed on the mobile device and collected by the call center agent, via scripts, over the air – without asking the subscriber – which enables the call center agent to receive dynamically or recently updated information about the characteristics or status of a mobile device (and/or associated calling party) before a voice conversation occurs [*wherein the selected content further comprises information regarding a*

prospective new transaction between the first party and the second party]. EX-1004, [0086]-[0087], [0082].

149. And, as I described above with respect to limitations [1.2] and [1.4] for Roundtree's pizza example, Roundtree describes that the system may use some or all of the enhanced number lookup methods discussed in Roundtree (EX-1004 [0068]), which, in my opinion, a POSITA would understand to include, for example, using the architecture described in FIG 6A (EX-1004 [0050]), the calling customer's mobile device intercepting the user's telephone call to the pizza restaurant and, before a voice connection is made, launching a browser to the predetermined "http://www.18007499263*669" webpage via a data network connection that displays, based on the calling customer's (and/or pizza restaurant's) preferences, the restaurant's saved available pizza sizes and types of pizza toppings (which Roundtree equates to a menu at the restaurant) [*wherein the selected content further comprises information regarding a prospective new transaction between the first party and the second party*]. EX-1004 [0069]-[0071], FIG. 8B, [0050]. In my opinion, a POSITA understood that Roundtree teaches that the restaurant's available pizza sizes and types of pizza toppings (which Roundtree equates to a menu at the restaurant) would be stored in a database, and accessible and displayable on the calling customer's mobile device via the "http://www.18007499263*669" webpage, to shorten, and make more effective,

the not-yet-established voice call between the customer and the pizza restaurant to order a new pizza. *Id.*; EX-1004 [0082] (describing an exemplary database relating unique identifiers for mobile devices and stored information transmitted to such devices (*e.g.*, information in FIG. 8B displays)), [0083] (describing that “[c]ustomer service calls may be shorter and more effective as a result of representatives receiving information from the user identifiers”).

Claim 11

The method of claim 1, wherein the selected content further comprises content displayed on one or more of the first device and the second device at the time of initiation of the communication connection.

150. Roundtree discloses this limitation for the same reasons that I discussed above with respect to Claims 9 and 10, and limitations [1.2] and [1.4].

Claim 12

The method of claim 1, further comprising, during said pausing: transmitting to the first device a menu for routing the communication connection within an organization comprising the second party; wherein the first device displays the menu after receipt.

151. Roundtree discloses, in FIG. 5 (and associated text), a display, of a calling customer’s mobile device [*first device*], of a menu for routing the communication connection within an organization of the call center [*second party*] including, menu selections, pull-down menus or entries allowing one or more

options to be selected, hypertext links. EX-1004 [0047]. The options include routing the data portion of the call to take different actions associated with the call center, e.g.,

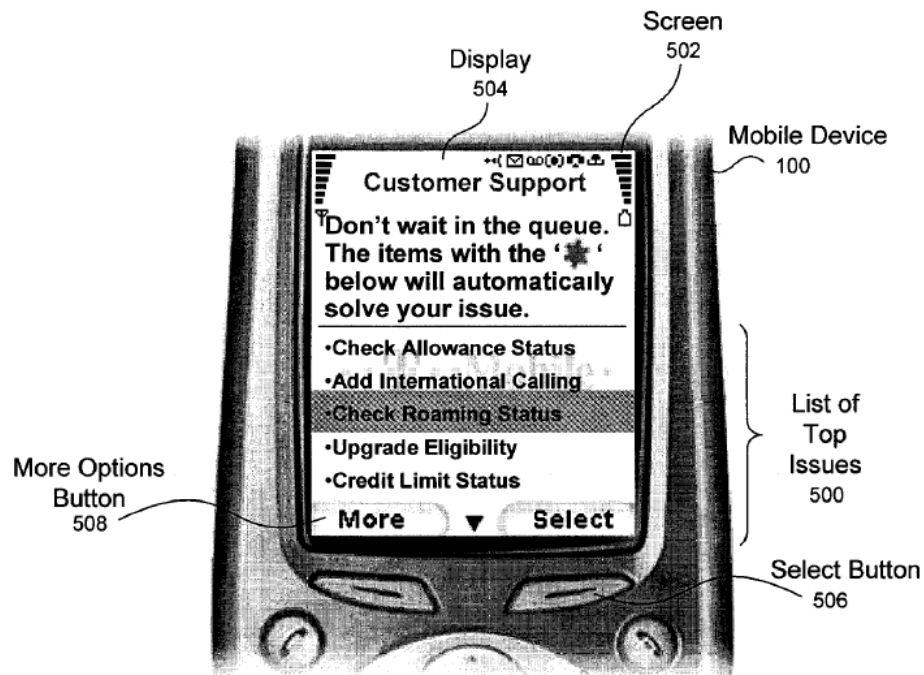


FIG. 5

EX-1004 [0047], [0048], FIG. 5. Roundtree discloses that the above-identified menu of routing options is received and then displayed, on the display of the calling customer's mobile device [*first device*], after the calling customer's call to a customer service support center is intercepted and before a voice connection is established [*during said pausing*] as I discussed above with respect to limitations [1.1] and [1.2]. EX-1004 [0049]-[0050]; FIG. 6A. Roundtree also discloses that the call center includes a software application, running on a processor, which, in

my opinion, a POSITA understood to be a call server, and discloses that a function of the customer support center call server is to direct mobile equipment so that it automatically processes requests it receives from mobile devices. EX-1004, [0053], FIG. 2, [0035].

152. Roundtree's above-identified disclosure that the data portion of the call can be routed to the call server at the call center for action, and within the organization of the call center, is, in my opinion, consistent with the disclosure of the '303 Patent that describes the data channel may be re-routed to the call controller, and is used to convey content to the telephones and to convey other data to the call server as necessary (e.g., to upload data from a telephone, activate a control within presented content). EX-1001 4:15-20, 22:1-2.

Claim 13

[13.0] A non-transitory computer-readable medium storing instructions that, when executed by a processor, cause the processor to perform a method of controlling presentation of content on a communication device, the method comprising:

153. To the extent the preamble is limiting, FIG. 2 of Roundtree discloses that mobile device and network based service include computer readable medium storing instructions that, when executed by a processor, cause the processor to perform the method recited below (and the method recited in claim 1). EX-1004, FIG. 2, [0034]-[0036], [0116]; *see also* my analysis of limitation [1.0] above.

[13.1] upon receipt of notification of initiation of a communication connection from a first device associated with a first party to a second device associated with a second party;

154. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.1].

[13.2] pausing establishment of the communication connection without soliciting action by the first party; and during said pausing, transmitting selected content toward the first device and/or the second device; and

155. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.2].

[13.3] after one of the first party and the second party terminates the communication connection, transmitting additional content toward the first device and/or the second device;

156. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.3].

[13.4] wherein the selected content comprises information regarding a previous transaction between the first party and the second party;

157. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.4].

[13.5] wherein the additional content comprises information regarding a new transaction conducted between the first

party and the second party during the communication connection; and

158. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.5].

[13.6] wherein the first device and/or the second device display the additional content after receipt.

159. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.6].

Claim 14

[14.0] Apparatus for controlling presentation of content on a communication device external to the apparatus, the apparatus comprising: one or more processors; and memory storing instructions that, when executed by the one or more processors, cause the apparatus to:

160. To the extent the preamble is limiting, FIG. 2 of Roundtree discloses that mobile device and network based service include one or more processors and memory storing instructions that, when executed by the one or more processors, cause the apparatus to perform the method recited below (and the method recited in claim 1). EX-1004, FIG. 2, [0034]-[0036], [0116]; *see also* my analysis of limitation [1.0] above.

[14.1] upon receipt of notification of initiation of a communication connection from a first device associated with a first party to a second device associated with a second party;

161. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.1].

[14.2] pause establishment of the communication connection without soliciting action by the first party; and during said pausing, transmit selected content toward the first device and/or the second device; and

162. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.2].

[14.3] after one of the first party and the second party terminates the communication connection, transmit additional content toward the first device and/or the second device;

163. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.3].

[14.4] wherein the selected content comprises information regarding a previous transaction between the first party and the second party;

164. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.4].

[14.5] wherein the additional content comprises information regarding a new transaction conducted between the first party and the second party during the communication connection; and

165. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.5].

[14.6] wherein the first device and/or the second device display the additional content after receipt.

166. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [1.6].

Claim 15

[15.0] The apparatus of claim 14,

[15.1] wherein pausing establishment of the communication connection comprises: transmitting to the first device a signal indicating that the communication connection should be paused;

167. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [2.1].

[15.2] wherein, in response to receipt of the signal, the first device initiates a delay in establishing the communication connection.

168. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [2.2].

Claim 16

[16.0] The apparatus of claim 14, wherein:

[16.1] the communication connection is a call; and

169. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [3.1].

[16.2] pausing establishment of the communication connection comprises instructing the first device to delay completion of dialing of the call.

170. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [3.2].

Claim 17

[17.0] The apparatus of claim 14,

[17.1] wherein pausing establishment of the communication connection comprises: transmitting to a call server associated with the first device a signal indicating that the communication connection should be paused;

171. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [4.1].

[17.2] wherein, in response to receipt of the signal, the call server initiates a delay in completing the establishment of the communication connection.

172. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [4.2].

Claim 18

[18.0] The apparatus of claim 14, wherein:

[18.1] the communication connection is a call; and

173. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [5.1].

[18.2] pausing establishment of the communication connection comprises instructing a call server associated with the first device to delay signaling of the call toward the second device.

174. Roundtree discloses this limitation for the same reasons that I discussed with respect to limitation [5.2].

Claim 19

The apparatus of claim 14, wherein the selected content is selected by the first party.

175. Roundtree discloses this limitation for the same reasons that I discussed with respect to Claim 6.

Claim 20

The apparatus of claim 14, wherein the selected content is selected by the second party.

176. Roundtree discloses this limitation for the same reasons that I discussed with respect to Claim 7.

Claim 21

The apparatus of claim 14, wherein the selected content is selected by a call controller operating in a path of communication between the first device and the second device.

177. Roundtree discloses this limitation for the same reasons that I discussed with respect to Claim 8.

Claim 22

The apparatus of claim 14, wherein the selected content is displayed one or more of: during said pausing; after the communication connection is established; and after the communication connection is terminated.

178. Roundtree discloses this limitation for the same reasons that I discussed with respect to Claim 9.

Claim 23

The apparatus of claim 14, wherein the selected content further comprises information regarding a prospective new transaction between the first party and the second party.

179. Roundtree discloses this limitation for the same reasons that I discussed with respect to Claim 7.

Claim 24

The apparatus of claim 14, wherein the selected content further comprises content displayed on one or more of the first device and the second device at the time of initiation of the communication connection.

180. Roundtree discloses this limitation for the same reasons that I discussed with respect to Claim 11.

Claim 25

The apparatus of claim 14, wherein the method further stores instructions that, when executed by the one or more processors, further cause the apparatus to: transmit to the first device a menu for routing the communication connection within an organization comprising the second

party; wherein the first device displays the menu after receipt.

181. Roundtree discloses this limitation for the same reasons that I discussed with respect to Claim 12.

VIII. CONCLUSION

182. For all the reasons set forth within my Declaration, it is my opinion that Claims 1-25 of the '303 Patent are unpatentable as obvious over the Roundtree reference (EX-1004).

CONCLUSION AND DECLARATION

The findings and opinions set forth in this declaration are based on my research and analysis to date. I may continue my examinations in view of additional documents or other factual evidence over the course of this proceeding that may necessitate supplementing and/or refining my opinions. I reserve the right to add to, alter, or delete my opinions and my Declaration upon discovery of additional information. I reserve the right to make such changes as necessary.

In signing this declaration, I understand that the declaration will be filed as evidence in a contested case before the Patent Trial and Appeal Board of the United States Patent and Trademark Office. I acknowledge that I may be subject to cross-examination in the case and that cross-examination will take place within the United States. If cross-examination is required of me, I will appear for cross-examination within the United States during the time allotted for cross-examination.

I declare that all statements made herein on my own knowledge are true, and that all statements made on information and belief are believed to be true, and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

[SIGNATURE ON FOLLOWING PAGE]

Dated: 3/23/26

By: 

Thomas F. La Porta, Ph.D.

APPENDIX A – MATERIALS RELIED UPON

<i>Exhibit #</i>	<i>Description</i>
1001	U.S. Patent No. 11,227,303 (“the ’303 Patent”).
1002	Prosecution History of the ’303 Patent (“File History”)
1004	U.S. Patent Publication No. 2007/0173237 (“Roundtree”).
1005	WIPO International Publication No. WO 2006/130783
1006	U.S. Patent Publication No. 2007/0116227 A1
1007	Excerpts of J. Thorner, “Intelligent Networks”, Artech House, Inc. 1994.
1008	Excerpts of L. Goleniewski, “Telecommunications Essentials”, Pearson Education, Inc., 2003.

APPENDIX B – *CURRICULUM VITAE*

THOMAS F. LA PORTA
207 Electrical Engineering West
The Pennsylvania State University
University Park, PA 16802
tlp@cse.psu.edu
814-865-6725

Highlights

Director, School of Electrical Engineering and Computer Science. Evan Pugh Professor. IEEE Fellow and Bell Labs Fellow. Received an Eta Kappa Nu Outstanding Young Electrical Engineer Award (one of three awarded), Bell Labs Distinguished Technical Staff Award, and seven best paper awards. Founding Editor-in-Chief of *IEEE Transactions on Mobile Computing* and past Editor-in-Chief of *IEEE Personal Communications*. Founding Director of the Institute of Networking and Security Research at Penn State. Previously Director of both the Mobile Networking Research in Bell Labs Research and the Advanced Mobile Networking in the Wireless Business Unit of Lucent. Co-inventor on 38 patents related to telecommunications, including two that won the Thomas Alva Edison Patent Award.

Education

1992 Ph.D., Electrical Engineering, Columbia University, New York, NY
1987 M.E., Electrical Engineering, The Cooper Union, New York, NY
1986 B.E., Electrical Engineering, The Cooper Union, New York, NY

Employment

2016-	Director, School of Electrical Engineering and Computer Science, Penn State
2016-	Evan Pugh Professor, Computer Science and Engineering, Penn State
2009-19	Director, Collaborative Technology Alliance Network Sciences Communications Network Academic Research Center (awarded \$35M grant to lead a major network sciences research center sponsored by the U.S. Army Research Lab)
2012-23	William E. Leonhard Chair in Engineering, Computer Science and Engineering, Penn State
2007-12	Distinguished Professor, Computer Science and Engineering, Penn State
2006, 2009	Distinguished Researcher, University of Roma La Sapienza (Su 06, Sp 09)
2002-06	Professor, Computer Science and Engineering, Penn State
2002-16	Founding Director, Institute of Networking and Security Research (formerly Networking and Security Research Center, Ben Franklin Center of Excellence), Penn State.
2000-02	Director, Advanced Mobile Networking Department, Wireless Networks Group, Lucent Technologies (concurrent with below)
1997-02	Director, Mobile Networking Research Department, Bell Laboratories Research, Lucent Technologies

1991-97 Distinguished Member of Technical Staff/Member Technical Staff, Bell
Laboratories Research, Lucent Technologies
1986-91 Member Technical Staff, Network Performance Center, AT&T Bell Labs

Consulting

2025 *Fish and Richardson*
Consulted on wireless communications systems.

2025 *DLA Piper – on behalf of Apple*
Consulted on mobile data systems. Wrote declaration with respect to IPR.

2025 *Desmarais LLP – on behalf of Cisco*
Consulted switch architectures, wrote declaration with respect to IPR.

2024-25 *Turner Boyd*
Consulted wireless communications systems.

2024 *Perkins Coie – on behalf of Intel*
Consulted on nine IPRs related to wireless communications systems. Wrote and
was deposed on nine declarations.

2022 *DLA Piper – on behalf of Apple*
Consulted on three IPRs related to mobile data systems. Wrote and was deposed
on three declarations.

2021-22 *Duane Morris – on behalf of Metaswitch C.A. No. 17-1736-RGA-SRF*
Consulted on VoIP switching technology, wrote reports.

2020 *Haynes and Boone – on behalf of Google*
Pre-IPR consulting on telephony systems.

2019 *EriseIP – Apple Inc. v. Maxell LTD, Case IPR2020-00201, on behalf of Apple*
Consulting on systems for wireless electronic displays and control, wrote
declaration with respect to IPR. Deposed on declaration.

2017-18 *Sidley – Huawei Technologies v. Samsung Electronics v. HiSilicon, N.D.
California. Civil Action No. 3:16-cv-2787-WHO, on behalf of Samsung*
Consulting on cellular telecommunications systems on 2 patents. Wrote
infringement, validity, non-infringement and invalidity reports, deposed.

2017 *Ropes and Gray - Nokia Technologies Oy & Alcatel-Lucent USA Inv. v. Apple
Inc. (E.D. Tex. Civil Action Nos. 2:16-cv-144 and 2:16-cv-1441, on behalf of
Apple*
Consulting on cellular communication systems.

- 2015-17 *Sidley - Intellectual Ventures LLC v. AT&T Mobility, et al Civil Action No. 12-cv-193-LPS, on behalf of US Cellular*
Consulting on cellular communication systems. Wrote report on invalidity. Deposed on report.
- 2016-17 *Duane Morris - Patent Asset Licensing, LLC v. WideOpenWest Finance, LLC et al., Case No. 3:15-cv-743-J-32MCR*
Wrote declarations with respect to IPRs for three patents. Deposed on declarations.
- 2014 *Sidley Austin – on behalf of Apple*
Consulting on cellular communication systems. Wrote declarations with respect to IPRs for three patents.
- 2012-14 *Winston Strom - Prism Technologies LLC v. Cellco Partnership d/b/a Verizon Wireless No. 8:12-cv-126-LES-TDT, on behalf of Verizon*
Consulting on secure transaction systems. Wrote report with respect to non-infringement.
- 2015 *Haynes Boone*
Consulted on patents with respect to signaling in cellular systems
- 2015 *Duane Morris AIP Acquisition, LLC v. Verizon Services Corp., et al., Case No. 1:14-cv-516-GMS, on behalf of Verizon*
Wrote declarations with respect to IPRs for two patents.
- 2011-2012: *Sidley Austin (EON vs. T-Mobile et al) Case No. 6:10-CV-379-LED-JDL, on behalf of RIM*
Consulted on telecommunications systems. Wrote expert report with respect to non-infringement. Deposed on report.
- 2009-2014: *Hogan Lovells (High Point SARL vs. Sprint Nextel Corp) Case No. 09-2269-CM-DJW, on behalf of Sprint*
Consulted on cellular telecommunications equipment. Deposed with respect to declaration on claim construction. Presented tutorial to court appointed Special Master. Testified as expert witness at Markman hearing. Wrote declarations with respect to inventorship, deposed twice on declarations.
- 2011 – 2012: *Nixon Peabody*
Consulted on cellular telecommunication systems.
- 2009 – 2010: *Goodwin Proctor*
Consulted on hybrid circuit/packet switched systems for voice communication. Deposed on expert report with respect to validity.

- 2009-2010: *Crowell and Moring*
Consulted on patent litigation for wireless messaging systems.
- 2007 - 2009: *Goodwin Proctor*
Consulted on cellular telecommunications systems. Deposed on expert report with respect to validity.
- 2007 - 2008: *Moses and Singer*
Consulted on patent litigation regarding secure data access.
- 2007: *Latham*
Consulted on patent litigation regarding telecommunications systems.
- 2006 – 2007: *Kirkland and Ellis*
Consulted on patent litigation regarding cellular services and Internet telephony (two clients).
- 2005-2006: *Moses and Singer*
Consulted on patent litigation regarding smart card technology. Deposed on expert reports regarding infringement and validity.
- 2005-2006: *Fish and Richardson*
Consulted on two patent litigations regarding security in cellular networks (2G and 3G), and WiFi, WiMax, 3G networks; evaluated one patent on wireless technology.
- 2005-2006: *Howrey*
Consulted on patent litigation regarding packet multimedia telephony and wireless technology. Deposed on expert report with respect to claim construction.

Honors and Awards

- **Evan Pugh Professor**, 2016, Penn State University (top 1% of faculty)
- **Faculty Teaching Award**, 2014, Dept. of Computer Science and Engineering
- **William E. Leonhard Chair in Engineering**, 2012
- **Thomas Alva Edison Patent Award**, 2009, Multiple-protocol home location register and method of use
- **Distinguished Professor**, 2007
- **IEEE Computer Society Golden Core Member**, 2005, for being a distinguished volunteer
- **Thomas Alva Edison Patent Award**, 2005, Wireless Packet System for Efficient Wide Area Bandwidth Utilization
- **IEEE Computer Society Meritorious Service Award**, 2004, for outstanding service as Editor-in-Chief of IEEE Transactions on Mobile Computing

- **IEEE Fellow**, 2002, to contributions to systems for advanced broadband, mobile data and mobile telecommunication networks
- **Bell Labs Fellow**, 2000, for outstanding contributions in mobile wireless networks in the areas of call processing, signaling, mobility management, and applications
- **An Eta Kappa Nu Outstanding Young Electrical Engineer Award** (one of three awarded), 1996
- **Bell Labs Distinguished Staff Award**, 1996, for outstanding research in call processing
- **Keynote talks**, IEEE ICDCS, IEEE MASS, IEEE ICCCN
- **Seven best paper awards** (IEEE ISSLS 1993, IEEE BSS 1995, IEEE ISSLS 1996, IEEE ICNP 2010, ACM Symposium on SDN Research 2017, SECURECOMM 2018, ACM MobiWAC 2021)

Professional Service

Editorships

2006-08	Editor-in-Chief, IEEE Applications of Practice Magazine
2003-04	Technical Editor, ACM Mobile Communications Review
2001-04	Founding Editor-in-Chief, IEEE Transactions on Mobile Computing
2000-10	Senior Advisor, IEEE Personal Communications Magazine
2000-05	Technical Editor, KICS/IEEE Journal of Communications and Networks
1997-99	Editor-in-Chief, IEEE Personal Communications Magazine
1995-10	Associate Editor, ACM/Kluwer Journal on Wireless Networks
1995-10	Associate Editor, ACM/Baltzer Journal of Mobile Networks and Applications
1993-96	Technical Editor, IEEE Personal Communications Magazine

Professional Societies and Associations

2025-	IEEE Transactions on Networking, Steering Committee
2013	Chair, IEEE Computer Society Transactions on Mobile Computing EiC Search Committee
2007-09	Member, Board of Governors, IEEE Communications Society
2006-07	Director of Magazines, IEEE Communications Society
2005-10	Steering Committee Member, IEEE/ACM Transactions on Networking (Co-chair, 2007)
2005-08	Steering Committee Member, IEEE Transactions on Mobile Computing (Chair, 2008-10)
2005	IEEE Computer Society Golden Core Member
2004-06	The President's National Security Telecommunications Advisory Committee (NSTAC)
2003	Chair, IEEE Computer Society Pervasive Computing EiC Search Committee
2003-	ACM Member
1984-	IEEE (Fellow, 2002)

Conference Committees

2013	General Chair, ACM Workshop on Mission Oriented Sensor Networks (MiseNet 2013)
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- 2011 General Co-Chair, IEEE International Conference on Network Protocols (ICNP 2011)
- 2009 Program Co-Chair, Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2009)
- 2009 Co-Chair, NSF Workshop on Future Directions of Wireless Sensor Systems
- 2008 Chair, NSF Workshop on Wireless Security, Atlanta, GA
- 2008 General Chair, IEEE Mobile Ad-hoc and Sensor Systems (MASS 2008)
- 2007 Program Chair, Annual IEEE International Conference on Pervasive Computing and Communications (PerCom 2007)
- 2006 General Co-Chair, International ICST Conference on Mobile and Ubiquitous Systems (MobiQuitous 2006) (sponsored by IEEE, ICST, and ACM)
- 2005 General Co-Chair, Annual International Conference on Mobile Computing and Networking (MobiCom 2005)
- 2004 Program Co-Chair, IEEE International Conference on Network Protocols (ICNP 2004)
- 2004 Program Co-Chair, International ICST Conference on Mobile and Ubiquitous Systems (MobiQuitous 2004) (co-sponsored by IEEE and ACM)
- 2004 Tutorial Chair, Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2004)
- 2003 Co-Chair, NSF Workshop on Wireless Networks
- 2001 Panel Chair, Annual International Conference on Mobile Computing and Networking (MobiCom 2001)
- 2000 Panel Chair, IEEE International Conference on Network Protocols (ICNP 2000)
- 1997 Tutorial Chair, IEEE INFOCOM 1997
- 1997 Tutorial Chair, IEEE International Conference on Network Protocols (ICNP 1997)
- 1996 Vice-Chair, Annual International Conference on Mobile Computing and Networking (MobiCom 1996)

Research Programs

Network Security:

Current PI on a cybersecurity program focused on cyber-deception funded by the US Army DEVCOM. Contributions include:

- Development and deployment of a honeypot to determine network scanning strategies and target selection for adversaries
- Developing consistent deception measures across cyber-domains to engage attackers and learn their attack strategies and tools (malware)

Co-PI on a \$48M recently concluded 10-year science of cyber security program funded by the Army Research Lab. Contributions included:

- Leader of the Deception Research Thrust of the overall program
- Developed algorithms to prevent malicious users from detecting the migration of a virtual machine between servers.

- Developed system to obfuscate network topologies from adversaries attempting to map Software Defined Networks (SDN).
- Developed methods by which an adversary can learn the rules in SDN switches and thus bypass network defenses
- Developed scalable network monitoring techniques
- Co-developed methods to deceive attackers to capture malicious code using realistic honeypots.

Smart Grid:

Co-PI on National Science Foundation project on increasing reliability of control infrastructure for the smart grid. Contributions included:

- Defined architecture to increase communication resiliency between smart grid components and management system
- Enabled load balancing at a faster time scale to decrease chances of power line outages.

Edge computing:

Project leader on a 5 year, \$15M Army Research Lab funded project on distributed analytics. Contributions included:

- Defined auction algorithms to assign compute jobs to edge servers to maximize system utility and limit misrepresentation by end users
- Developed and implemented algorithms to perform video analytics sharing processing between cellphones and edge servers to perform action detection
- Developed and implemented algorithms to perform object detection and localization in images stored on mobile devices using cell phones and edge computers

Network Science:

Director and overall PI of the Communications Network Academic Research Center funded by the U.S. Army Research Lab leading a team of 23 PIs and 9 institutions Contributions included:

- Defined and formalizing a metric called Quality of Information which allows requestors of information to specify characteristics of the information they require to make decisions.
- Defined, formalized and modeled a new measure of network capacity called the Operational Information Content Capacity (OICC) which measures the amount of information of sufficient quality carried by a network.
- Worked with computational linguistics researchers, defined algorithms for optimal information retrieval strategies given uncertainty of query requirements based on pragmatic query transformation.
- Developed algorithms for resource allocation in highly dynamic wireless

environments for extracting information of specified quality from stored video.

Lead Defense Threat Reduction Agency (DTRA) funded effort on network reliability jointly with Army Research Lab. Contributions included:

- Defined new algorithms for diagnosing large-scale network failures based on partial information of network endpoint connectivity.
- Defined new algorithms for minimum cost network restoration given mission critical applications that must be supported.
- Developed models for the spread of failures between multiple networks with different structures, determining topologies and interconnect architectures that slow and speed the spread between networks; won best student poster at DTRA PI meeting.
- Developed algorithms to infer a network topology based on partial information; resulting algorithm performed significantly better than competing solutions in terms of network metrics.

Wireless Sensor Networks:

Leader of the Sensor Information Processing and Delivery Technical Area of the U.S. ARL and U.K. MoD 10-year joint International Technology Alliance (ITA) program for five years, and currently Project Champion. Also partially funded by NSF. Contributions included:

- Developed algorithms for resource allocation given statistical uncertainty of the value of future observations, the exact resources consumed by future tasks, and the uncertainty of event of interest that will occur. This work is being featured at the ITA capstone event.
- Algorithms to formalize information needs and allocate sensing and communications resources to meet these needs. Work has been transitioned into both the U.S. Army and U.K. MoD.
- Algorithms and protocols to optimally allocate resources in a multi-hop wireless sensor networks to maximize network utility including in-network data transformations.
- Algorithms based on Voronoi and Laguerre geometry to move sensors to increase network coverage and recover from node failure.
- Key distribution algorithms to ensure secure sensor communication. Submitted to IEEE 802.11 standards group by partnering company (3ETI).

Mobile Telecommunication Networks:

Leading research on signaling, call processing, mobility management, security, and hybrid wireless solutions for cellular telecommunication systems. Funded by NSF and ARO. Contributions include:

- Tools and algorithms for ensuring security in wireless telecommunication networks. Feature article in *NY Times* business section, October 2005. Appointed to The President's National Security Telecommunications Advisory Committee.

- Develop lightweight protocol interworking algorithms that led to the industry's first system supporting seamless global roaming between U.S. and international standards, and WiFi networks. Resulted in product deployed in Lucent-built third generation wireless networks and currently supports more than 100 million subscribers. Team consisted of 8 researchers and up to 50 developers. Won Bell Labs President's Gold Medal and Thomas Alva Edison Patent Award.
- Distributed software control architectures based formal decomposition of functions and data structures that drastically reduced data movement and signaling overhead in mobile environments. Led to network controllers deployed in CDMA2000 and UMTS networks.
- An IP-based mobile switching center with new efficient mobility management and signaling protocols. This was the first "soft-switch" which is now a standard part of all Internet-telephony and third generation wireless systems. Awarded Thomas Alva Edison Patent Award.
- Multiclass algorithms and software for signaling overload control for wireless call processing. Deployed in CDMA2000 mobile switching centers.
- Architecture and protocols for forming and managing hybrid wireless networks that maintain signal orthogonality and support diversity to improve wireless network performance.

Mobile Wireless Data Systems:

Leading research on network architectures, protocol design, and software systems to enable all-IP mobile networks. Funded by NSF. Contributions include:

- Algorithms and protocols to preserve location privacy while enabling the use of network-based location-based services.
- A novel architecture, service-set, and protocols for web access and messaging services from traditional cellular handsets. Led to initial text messaging products from Lucent Technologies.
- Algorithms for optimal rate control and resource allocation for networks that employ network coding.
- Algorithms for enabling secure and highly scalable RFID networks.
- Security solutions that enable network-based performance enhancements
- Micromobility protocol (HAWAII) and IP paging services. Led to formation of a working group at the Internet Engineering Task Force.
- Security protocols application support to enable 802.11/3G roaming. Led to product offering from Lucent Technologies.
- An asymmetric link layer protocol (AIRMAIL) designed specifically for wireless links. Incorporated into CDMA2000 standards.

Software for Telecommunication Network Control:

Led and participated in several projects on call processing and service control for ISDN and B-ISDN networks.

Ph.D. Research (advised by Prof. Mischa Schwartz)

MultiStream Protocol (MSP): Designed, validated, and implemented a new feature-rich high-speed transport protocol on a parallel processor platform.

Students

Advising 3 Ph.D. students; graduated 22 Ph.D. students, 16 M.S. students, and 5 Honors students.

Grants

Planning DCL EPSCOR: CISE Large: Distributed Edge Intelligence in Support of Next Generation Applications, With UKY, PI

(Co-PIs He and Cantor), National Science Foundation, \$100K, 2024-25.

Deception and Learning in a Contested Multidomain Environment, PI

(Co-PIs Cao and Miller), DEVCOM, \$1.2M, 2024-26.

Collaborative Research Alliance, Cyber CRA (Cyber Security),

Co-PI (PI: McDaniel), ARL, up to \$48M (\$600K for candidate), 2013–2023.

CPS: Medium: Coupled cAscade Modeling, Prevention, and Recovery, Co-PI (PI:

Chaudhuri, Co-PI: He), NSF, \$999,000, 2018-23

CSR: Small: Energy-Aware and QoE-Aware Video Streaming on Mobile Devices,

Co-PI (PI: Cao), NSF, \$, 2018-23.

International Technology Alliance, Distributed Analytics Information Sciences

(DAIS), US Army Research Lab & UK Ministry of Defence, PI, \$1.6M, 9/16–9/21.

(One of 6 project leads on team of 14 partners including industry and academia, Prime: IBM).

International Technology Alliance (CONCERTO), Network and Information Sciences

International Technology Alliance, US Army Research Lab & UK Ministry of Defence, PI, \$2.5M, 5/06–5/14. (One of 4 technical area leads on team of 12 partners including industry and academia, Prime: IBM).

Collaborative Technology Alliance Network Sciences Communications Network

Academic Research Center, Overall PI and Center Director ARL, \$35M, 2009–2018 (renewed in 2014). (Penn State Amount for 9/08–9/16 is \$7.7M).

HDTRA1-10-1-0085: State Estimation and Optimal Recovery in networks with Massive Cascading Failures – Topic D: Network Adaptability from WMD

Disruption and Cascading Failures, PI (Co-PI: Cao and Swami [US-ARL]), Defense Threat Reduction Agency, (option years added in 2014) \$1,650,000, 8/10–5/16.

Wireless Network Defense, PI, DARPA (sub to Lockheed Martin), \$150,000, 2013–2014.

MANET and DTN Routing for Tactical Networks, PI (Co-PI: Cao), CERDEC, \$175,000, 2013–2014.

Small: Efficient Energy-Aware Web Browsing in Wireless Networks, Co-PI (PI: Cao), NSF, \$499,368, 2012–2015.

QoI-Aware Named Data Networking, PI, Harris Corp, \$50,000, 2012–2013.

Student Travel Support for IEEE ICNP, PI, NSF, \$10,000, 2011.

Aqua – QoI-Aware client, co-PI (PI: Govindan, USC), US-Army Research Lab, \$50,000, 2011–2012.

Harnessing Network Coding Gains in Multi-Rate Wireless Networks, PI (PI:

Krishnamurthy, UC Riverside), NSF, \$240,000, 2010–2013.

Characterizing and Mitigating Wireless Systems Vulnerabilities, Defense University Research Instrumentation Program (DURIP), Co-PI (PI: McDaniel), Army Research Office (ARO), \$150,000, 5/09–5/10.

Supporting Multi-Missions in Wireless Sensor Networks, Co-PI (PI: Cao), NSF, \$450,000, 2009–2012.

Collaborative Research: Security Services in Open Telecommunications Networks, Co-PI (PI: McDaniel), NSF, \$598,488, 2009–2012.

Secure Supply Chain Management for Telecom, PI (with McDaniel and Shu), Alcatel-Lucent, \$110,000, 2009.

Secure 3G/4G Mobility, PI, SPRINT Labs, \$55,000, 2008–2009.

Network State Discovery and Analysis in Defense of WMD Attacks, PI, (with Cao), Defense Threat Reduction Agency, \$215,000, 2008–2009.

Wireless Mesh with Mobility, PI (with Cao), The Technology Collaborative, \$172,000, 8/07–7/08.

ARSENAL: A Cross Layer Architecture for Secure and Resilient Tactical Mobile Ad Hoc Networks, co-PI (PI: Cao), ARO MURI, \$780,000, 6/07–5/12.

Wireless Network Security, PI (with Yener and Jaeger), Raytheon, \$50,000, 1/07–12/07.

Security for Internet/IMS Convergence, PI (with Jaeger and McDaniel), Cisco URP, \$100,000, 2007–2008.

NeTS WN: Protecting Services for Emerging Wireless Telecommunications Infrastructure, PI, NSF, \$400,000, 2007–2009.

Ben Franklin Center of Excellence for the Networking and Security Research Center, Director and PI, \$175,000, 2007–2009.

Mobile Sensor Systems, PI (with Cao), The Technology Collaborative, \$140,000, 7/06–6/07.

Telecommunications Evolution and Security, PI (with Yener and Jaeger), Raytheon, \$50,000, 6/06–12/06.

Distributed Adaptive Channelization Control, DARPA CBMANET Program, PI (with Yener), \$303,000, 6/06–12/07. (Prime: BAE Systems CONCERTO Project).

Overload Controls for SIP Servers, IBM Faculty Award Program, PI, \$30,000, 2006.

NeTS-NOSS: Controllable Node Mobility for Mission-Oriented Sensor Networks, co-PI (PI: Cao, Kesidis, Das), National Science Foundation, \$458,000, 9/05–8/09.

Capacity Building Information Assurance, senior personnel (PI: Liu and others), National Science Foundation DUE, \$296,466 8/05–7/06.

CRI: Collaborative Research: WORKIT: A Universal Wireless Open Research KIT, PI (with other institutions), National Science Foundation, \$124,956, 8/05–7/08.

Efficient Hybrid Security for Networks of Simple Devices, PI (with Cao), The Technology Collaborative, \$166,288, 7/05–6/06.

SGER: Exploratory Research on Relay Network of Agile Radios, National Science Foundation, PI (with Yener), \$95,018, 3/05–9/06.

Group Mobility Management for Sensors, DARPA/ONR Emerging Surveillance Plexsus (ESP), subcontract with PSU ARL, \$72,000, 1/05–12/05.

Mobile Multi-Layered IPsec: Advanced Services, PI (with Cao), The Technology Collaborative, \$178,435, 1/05–12/05.

Secure Services in IP-Based Third Generation Wireless Networks, IBM Faculty

Award Program, PI, \$30,000, 2005.

Student International Travel Support for IEEE International Conference on Networking Protocols (ICNP 2004); October 5-8, 2004; Berlin, Germany, PI,
National Science Foundation, \$15,500, 9/04–8/05.

Asymmetric Security Solutions for Networks of Simple Devices, PI (with Cao), The
Technology Collaborative, \$184,000, 7/04–6/05

Group Mobility Management for Sensors, DARPA/ONR Emerging Surveillance
Plexsus (ESP), subcontract with PSU ARL, \$30,000, 5/04–12/04.

Mobile Multi-layered IP Security, PI (with Cao), Pittsburgh Digital Greenhouse,
\$189,000, 7/03–6/04.

CISCO CIAG Equipment Donation, co-PI (with Liu, Chen), \$110,000, 2003.

Journals Publications

1. La Porta, T. F., M. Schwartz. May 1993. The MultiStream Protocol: A Highly Flexible High-Speed Transport Protocol. *IEEE Journal on Selected Areas in Communications* 11(4):519-530.
2. La Porta, T. F., M. Schwartz. December 1993. Performance Analysis of MSP Feature-Rich High-Speed Transport Protocol. *IEEE/ACM Transactions on Networking* 1(6):740-753.
3. La Porta, T. F., M. Veeraraghavan. 1993. Evaluation of Broadband UNI Signaling Protocol Techniques. *Journal of High Speed Networks* 2(3):209-238. IOS Press.
4. La Porta, T. F., M. Schwartz. February 1994. Verification of the MultiStream Protocol (MSP) Using COSPAN. *Formal Methods in System Design* 4(2):123-153.
5. Veeraraghavan, M., T. F. La Porta. 1994. Object-Oriented Analysis of Signaling and Control in Broadband Networks. *International Journal of Communication Systems* 7:131-148.
6. Ayanoglu, E., S. Paul, T. F. La Porta, K. K. Sabnani, R. D. Gitlin. 1995. AIRMAIL: A Link-Layer Protocol for Wireless Networks. *ACM/Baltzer Wireless Networks Journal* 1(1):47-59.
7. Veeraraghavan, M., T. F. La Porta, R. Ramjee. 1995. A Distributed Control Strategy for Wireless ATM Networks. *ACM/Baltzer Wireless Networks Journal* 1(3):323-339.
8. La Porta, T. F., M. Veeraraghavan, P. Treventi, R. Ramjee. June 1995. Distributed Call Processing for Personal Communications Services. *IEEE Communications Magazine* 33(6):66-75.
9. Veeraraghavan, M., T. F. La Porta, W. S. Lai. November 1995. An Alternative Approach to Call/Connection Control in Broadband Switching Systems. *IEEE Communications Magazine* 33(11):90-97.
10. Ramjee, R., T. F. La Porta, M. Veeraraghavan. December 1995. The Use of Network-based Migrating User Agents for PCS. *IEEE Personal Communications Magazine*. pp. 62-68.
11. La Porta, T. F., K. K. Sabnani, A. S. Sawkar. Autumn, 1996. Distributed Call Processing for Wireless Mobile Networks. *Bell Labs Technical Journal* 1(2):127-142.
12. La Porta, T. F., K. K. Sabnani, R. D. Gitlin. 1996. Challenges for Nomadic Computing: Mobility Management and Wireless Communications. *ACM/Baltzer Journal on Mobile Networks and Nomadic Applications* 1(1):3-16.
13. La Porta, T. F., M. Veeraraghavan, R. W. Buskens. December 1996. Comparison of Signaling Loads for PCS Systems. *IEEE/ACM Transactions on Networking* 4(6):840-856.
14. La Porta, T. F., K-W. Chen. August 1997. A Direct Signaling System for Flexible Access and Deployment of Telecommunication Services. *IEEE/ACM Transactions on Networking* 5(4):489-501.
15. Woo, T., T. F. La Porta, K. K. Sanbani. October 1997. Pigeon: A Wireless Two-Way Messaging System. *IEEE Journal on Selected Areas in Communications* 15(8):1391-1405.

16. Ramjee, R., T. F. La Porta, J. Kurose, D. Towsley. June 1998. Performance Evaluation of Connection Re-Routing Schemes for ATM-based Wireless Networks. *IEEE/ACM Transactions on Networking* 6(3):249-261.
17. La Porta, T. F., R. Ramjee, T. Woo, K. K. Sabnani. August 1998. Experiences with Network-Based User Agents for Mobile Applications. *ACM/Baltzer Journal of Mobile Networks and Applications* 3(2):123-141.
18. La Porta, T. F. 1999. Signaling. Chapter in *Wiley Encyclopedia of Electrical and Electronics Engineering* 19:276-284. Ed. J. G. Webster.
19. Shah, N., A. Sawkar, J. Marinho, K. K. Sabnani, T. F. La Porta, T. C. Chiang. January-March 2000. Wireless Data Networking, Standards, and Applications. 5(1):130-149.
20. Ramjee, R., T. F. La Porta, L. Salgarelli, S. Thuel, K. Varadhan, L. Li. August 200. IP-Based Access Network Infrastructure for Next Generation Wireless Data Networks. *IEEE Personal Communications Magazine* 7(4):34-41.
21. Ramjee, R., T. F. La Porta, J. Kurose, D. Towsley. November 2000. User Agent Migration Policies in Wireless Networks. *IEEE Journal of Selected Areas of Communication* 18(11):2465-2489.
22. Lennox, J., K. Murakami. M. Karaul, T. F. La Porta. October 2001. Interworking Internet Telephony and Wireless Telecommunications Networks. *ACM Computer Communications Review* 31(5):25-36.
23. Thuel, S., L. Salgarelli, R. Ramjee, T. F. La Porta. 2002. Dynamic Configuration of Mobile Devices for Wireless Internet Access. *Mobile and Wireless Internet Access*, Chapter 10. Edited by K. Makki. Kluwer Academic Publishers.
24. Ramjee, R., K. Varadhan, L. Salgarelli, S. Thuel, T. F. La Porta. June 2002. HAWAII: A Domain Based Approach for Mobility in Wide-Area Wireless Networks. *IEEE/ACM Transactions on Networking* 10(3):396-410.
25. Ramjee, R., L. Li, T. F. La Porta, S. Kasera. September 2002. IP Paging Service for Mobile Hosts. *ACM/Kluwer Journal on Wireless Networks* 8(5):427-441.
26. Haase, O., K. Murakami, T. F. La Porta. August 2003. Unified Mobility Manager - Enabling Efficient SIP/UMTS Mobile Network Control. *IEEE Wireless Communications* 10(4):66-75.
27. Murakami, K., O. Haase, J. Shin*, T. F. La Porta. June 2004. Mobility Management Alternatives for Migration to Mobile Internet Session-Based Services. *IEEE Journal on Selected Areas of Communications* 22(5):818-833. (Third author supervised by candidate)
28. Yashiro, T., T. F. La Porta. December 2005. Nomadic Agent System: Infrastructureless Location Based Service System. *Journal of Information Processing Society of Japan* 46(12):2952-2962.
29. Wang*, G., G. Cao, T. F. La Porta. June 2006. Movement Assisted Sensor Deployment. *IEEE Transactions on Mobile Computing* 5(6):640-652. (First author co-supervised by candidate)
30. Shin*, J., K. H. Lee, A. Yener, T. F. La Porta. August 2006. On-demand Diversity Wireless Relay Networks. *ACM Journal of Mobile Networks and Applications* 11(4):593-611. (First author supervised by candidate)

31. Wang*, G., G. Cao, P. Berman, T. F. La Porta. May 2007. Bidding Protocols for Deploying Mobile Sensors. *IEEE Transactions on Mobile Computing* 6(5):563-576. (First author co-supervised by candidate)
32. Traynor*, P., R. Kumar*, H. Choi*, G. Cao, S. Zhu, T. F. La Porta. June 2007. Efficient Hybrid Security Mechanisms for Heterogeneous Sensor Networks. *IEEE Transactions on Mobile Computing* 6(6):663-677. (First author co-supervised and second and third authors supervised by candidate)
33. Zhang, W., G. Cao, T. F. La Porta. 2007. July 2007. Data Dissemination with Ring-Based Index for Wireless Sensor Networks. *IEEE Transactions on Mobile Computing* 6(7):832-847.
34. Kotapati*, K., P. Liu, T. F. La Porta. August 2007. Dependency Relation Based Vulnerability Analysis of 3G Networks: Can It Identify Unforeseen Cascading Attacks? *Telecommunications Systems, Special Issue on Security, Privacy and Trust for Beyond 3G Networks* 35(3-4):99-122. (First author supervised by candidate)
35. Zhang, W., G. Cao, T. F. La Porta. October 2007. Dynamic Proxy Tree-Based Data Dissemination Schemes for Wireless Sensor Networks. *ACM/Kluwer Wireless Networks (WINET)* 13(5):583-595.
36. Shin*, J., R. Kumar*, P. Kishen*, T. F. La Porta. November 2007. Channelization for Dynamic Multi-Frequency, Multi-Hop Wireless Cellular Networks. *Ad Hoc Networks Journal* 5(8):1284-1302. (First three authors supervised by candidate)
37. Tonesi, D., Y. Sun*, L. Salgarelli, T. F. La Porta. February 2008. Evaluation of Signaling Loads in 3GPP Networks. *IEEE Wireless Communications* 15(1):92-100. (Second author supervised by candidate)
38. Kumar*, R., R. Crepaldi, H. Rowaihy*, A. Harris, G. Cao, F. Anjum, M. Zorzi, T. F. La Porta. June 2008. Mitigating Performance Degradation in Congested Sensor Networks. *IEEE Transactions on Mobile Computing* 7(6):682-697. (First and third authors supervised by candidate)
39. Choi*, H., H. Song, G. Cao, T. F. La Porta. December 2008. Mobile Multi-Layered IPsec. *ACM/Springer Wireless Networks (WINET)* 14(6):895-913. (First author supervised by candidate)
40. Traynor*, P., W. Enck, P. McDaniel, T. F. La Porta. December 2008. Exploiting Open Functionality in SMS-Capable Cellular Networks. *Journal of Computer Security* 16(6):713-742. IOS Press. (First author co-supervised by candidate)
41. Eswaran*, S., M. Johnson, A. Misra, T. F. La Porta. January 2009. Distributed Utility-Based Rate Adaptation Protocols for Prioritized, Quasi-Elastic Flows. *ACM SIGMOBILE Mobile Computing and Communications Review (M2CR)* 13(1):2-13. (First author supervised by candidate)
42. Traynor*, P., W. Enck, P. McDaniel, T. F. La Porta. February 2009. Mitigating Attacks on Open Functionality in SMS-Capable Cellular Networks. *IEEE/ACM Transactions on Networking* 17(1):40-53. (First author co-supervised by candidate)
43. Sun*, Y., T. F. La Porta, P. Kermani. March 2009. A Flexible Privacy-Enhanced Location Based Services System Framework and Practice. *IEEE Transactions on Mobile Computing* 8(3):304-321. (First author supervised by candidate)
44. Choi*, H., W. Enck, J. Shin*, P. McDaniel, T. F. La Porta. May 2009. ASR: Anonymous and Secure Reporting of Traffic Forwarding Activity in Mobile Ad Hoc Networks. *ACM Wireless Networks (WINET)* 15(4):525-539. (First and third authors supervised by candidate)

45. Venkateswaran, A., V. Sarangan, T. F. La Porta, R. Acharya. June 2009. A Mobility-Prediction-Based Relay Deployment Framework for Conserving Power in MANETs. *IEEE Transactions on Mobile Computing* 8(6):750-765.
46. Kotapati*, K., P. Liu, T. F. La Porta. November 2009. Evaluating MAPSec by Marking Attack Graphs. *Kluwer/ACM Wireless Networks Journal* 15(8):1042-1058. (First author supervised by candidate)
47. Bar-Noy, A., T. Brown, M. Johnson, T. F. La Porta, O. Liu, H. Rowaihy*. July 2010. Sensor-Mission Assignment in Wireless Sensor Networks. *ACM Transactions on Sensor Networks*. Volume 6, Issue 4, Article 36, 33 pages. (Sixth author supervised by candidate) (Peer reviewed)
48. Rowaihy*, H., M. Johnson, D. Pizzacaro, A. Bar-Noy, A. Preece, T. F. La Porta. November 2010. Sensor Mission Assignment in Constrained Environments. *IEEE Transactions on Parallel and Distributed Systems* 21(11):1692-1705. (First author supervised by candidate) (Peer reviewed)
49. La Porta, T. F., G. Maselli, C. Petrioli. February 2011. Anti-collision Protocols for Single-Reader RFID Systems: Temporal Analysis and Optimization. *IEEE Transactions on Mobile Computing* 10(2):267-279.
50. Wang*, G., M. J. Irwin, H. Fu, P. Berman, W. Zhang, T. F. La Porta. February 2011. Optimizing Sensor Movement Planning for Energy Efficiency. *ACM Transactions on Sensor Networks*. Volume 7, Issue 4, Article 33, 17 pages. (First author co-supervised by candidate)
51. Bartolini, N., T. Calamoneri, T. F. La Porta, S. Silvestri. June 2011. Autonomous Deployment of Heterogeneous Mobile Sensors. *IEEE Transactions on Mobile Computing* 10(6):753-766.
52. Traynor*, P., C. Amrutkar, V. Rao, T. Jaeger, P. McDaniel, T. F. La Porta. June 2011. From Mobile Phones to Responsible Devices. *Journal of Security and Communication Networks (SCN)* 4(6):719-726. (First author co-supervised by candidate) (Peer reviewed)
53. Kumar*, R., T. F. La Porta. July 2011. Cooperative Channelization in Wireless Networks with Network Coding. *IEEE Transactions on Processing and Distributed Systems* 22(7):1073-1084. (First author supervised by candidate)
54. Alayev, Y., A. Bar-Noy, T. F. La Porta. August 2011. Broadcasting Info-Pages to Sensors: Efficiency vs. Energy Conservation. *ACM/Springer Wireless Networks Journal* 17(6):1529-1542.
55. Tang, L., X. Yu, S. Kim, J. Han, W.-C. Peng, Y. Sun, A. Leung, T. F. La Porta. 2012. Multidimensional Sensor Data Analysis in Cyber-Physical System: An Atypical Cube Approach. *International Journal of Distributed Sensor Networks*. 19 pages.
56. Chen*, F., M. Johnson, Y. Alayev, A. Bar-Noy, T. F. La Porta. January 2012. Who, When, Where: Timeslot Assignment to Mobile Clients. *IEEE Transactions on Mobile Computing* 11(1):73-85. (First author supervised by candidate)
57. Eswaran*, S., A. Misra, F. Bergamaschi, T. F. La Porta. March 2012. Utility-based Bandwidth Adaptation in Mission-Oriented Wireless Sensor Networks. *ACM Transactions on Sensor Networks*. Volume 8, Issue 2, 17 pages. (First author supervised by candidate)
58. Neely, M. J., S. Rager*, T. F. La Porta. May 2012. Max Weight Learning Algorithms for Scheduling in Unknown Environments. *IEEE Transactions on Automatic Control* 57(5):1179-1191. (Second author supervised by candidate)
59. Bartolini, N., T. Calamoneri, T. F. La Porta, C. Petrioli. July 2012. Sensor Activation and Radius Adaptation (SARA) in Heterogeneous Sensor Networks. *ACM Transactions on Sensor Networks*. Volume 8, Issue 3, 24 pages.

60. Eswaran*, S., A. Misra, T. F. La Porta. August 2012. Control-theoretic Utility Maximization in Multihop Wireless Networks under Mission Dynamics. *IEEE/ACM Transactions on Networking* 20(4):1082-1095. (First author supervised by candidate)
61. Eswaran*, S., J. Edwards*, A. Misra, T. F. La Porta. September 2012. Adaptive In-Network Processing for Bandwidth and Energy Constrained Mission-Oriented Multihop Wireless Networks. *IEEE Transactions on Mobile Computing* 11(9):1484-1498. (First two authors supervised by candidate)
62. Chen*, F., M. Johnson, A. Bar-Noy, I. Fermin, T. F. La Porta. October 2012. Proactive Data Dissemination to Mission Sites. *Wireless Networks* 18(7):749-762. (First author supervised by candidate)
63. Gao, W., G. Cao, T. F. La Porta, J. Han. January 2013. On Exploiting Transient Social Contact Patterns for Data Forwarding in Delay Tolerant Networks. *IEEE Transactions on Mobile Computing* 12(1):151-165.
64. Ray*, S., T. F. La Porta, P. Basu, G. Cao, S. Schaffer, D. Dent. March 2013. Metric Driven Mobility Modeling in Tactical Networks. *Journal of Defense Modeling and Simulation* 10(2):161-179.
65. Tang, L., X. Yu, S. Kim, Q. Gu, J. Han, A. Leung, T. F. La Porta. May 2013. Trustworthiness Analysis of Sensor Data in Cyber-physical Systems. *Journal of Computer and System Sciences* 79(3):383-401.
66. Basu, P., R. Gibbens, T. F. La Porta, C.-Y. Lin, A. Swami, E. Yoneki. June 2013. Guest Editorial: Network Science. *IEEE Journal on Selected Areas in Communications* 31(6):993-996.
67. Kim, T.-S., I. Broustis, S. Vural, D. Syrivelis, S. Singh, S. V. Krishnamurthy, T. F. La Porta. June 2013. Realizing the Benefits of Wireless Network Coding in Multi-Rate Settings. *IEEE/ACM Transactions on Networking* 21(3):950-962.
68. Tang, L., Y. Zheng, J. Yuan, J. Han, A. Leung, W.-C. Peng, T. F. La Porta. December 2013. A Framework of Traveling Companion Discovery on Trajectory Data Streams. *ACM Transactions on Intelligent Systems and Technology*. Volume 5, No. 1, Article 3, 34 pages.
69. Bartolini, N., G. C. Bongiovanni, T. F. La Porta, S. Silvestri. February 2014. On the Vulnerabilities of the Virtual Force Approach to Mobile Sensor Deployment. *IEEE Transactions on Mobile Computing* 13(11):2592-2605.
70. Li, Q., G. Cao, T. F. La Porta. March 2014. Efficient and Privacy-Aware Data Aggregation in Mobile Sensing. *IEEE Transactions on Dependable and Secure Computing* 11(2):115-129.
71. Edwards*, J., A. Bahjat*, Y. Jiang, T. Cook, T. F. La Porta. April 2014. Quality of Information-aware Mobile Applications. *Pervasive and Mobile Computing* 11:216-228. Elsevier. (First and second authors supervised by candidate)
72. Zhang, C., J. Han, L. Shou, J. Lu, T. F. La Porta. May 2014. Splitter: Mining Fine-Grained Sequential Patterns in Semantic Trajectories. *PVLDB* 7(9):769-780.
73. La Porta, T. F., C. Petrioli, C. Phillips, D. Spenza. June 2014. Sensor-mission Assignment in Rechargeable Wireless Sensor Networks. *ACM Transactions on Sensor Networks*. Volume 10, Issue 4, Article 60, 39 pages.
74. Alayev, Y., F. Chen*, Y. Hou, M. P. Johnson, A. Bar-Noy, T. F. La Porta, K. K. Leung. July 2014. Throughput Maximization in Mobile WSN Scheduling With Power Control and Rate Selection. *IEEE Transactions on Wireless Communications* 13(7):4066-4079.

75. Zheng, Q., G. Cao, T. F. La Porta, A. Swami. July 2014. Cross-Layer Approach for Minimizing Routing Disruption in IP Networks. *IEEE Transactions on Parallel Distrib. Syst.* 25(7):1659-1669.
76. Ciftcioglu, E. N., A. Michaloliakos, A. Yener, K. Psounis, T. F. La Porta, R. Govindan. December 2014. Operational Information Content Sum Capacity: From Theory to Practice. *Computer Networks* 75(1-17).
77. Tati*, S., B. Ko, G. Cao, A. Swami, T. F. La Porta. March 2015. Adaptive Algorithms for Diagnosing Large-scale Failures in Computer Networks. *IEEE Transactions on Parallel and Distributed Systems* 26(3):646-656.
78. Tang, L. A., X. Yu, Q. Gu, J. Han, G. Jiang, A. Leung, T. F. La Porta. April 2015. A Framework for Mining Trajectories from Untrustworthy Data in Cyber-Physical System. *ACM Transactions on Knowledge Discovery from Data*. Volume 9, Issue 13, Article 16, 35 pages.
79. Papageorgiou, G., S. Singh, S. V. Krishnamurthy, R. Govindan, T. F. La Porta. April 2015. A Distortion-resistant Routing Framework for Video Traffic in Wireless Multihop Networks. *IEEE/ACM Transactions on Networking* 23(2):414-425.
80. Tati*, S., S. Rager, B.-J. Ko, G. Cao, A. Swami, T.F. La Porta, netCSI: A Generic Fault Diagnosis Algorithm for Large-Scale Failures in Computer Networks, *IEEE Transactions on Dependable and Secure Computing* 13(3):355-368, May/June 2016.
81. Lu, Z., X. Sun, W. Wen, G. Cao. T.F. La Porta, Algorithms and Applications for Community Detection in Weighted Networks, *IEEE Transactions on Parallel and Distributed Systems*, to appear.
82. Alayev, Y., A. Bar-Noy, M. Johnson, L. Kaplan, T. F. La Porta. July 2015. You Can't Get There from Here: Sensor Scheduling with Refocusing Delays. *Wireless Networks* 21(5):1683-1698.
83. Atya, A., I. Broustis, S. Singh, D. Syrivelis, S. Krishnamurthy, T.F. La Porta, A Policy Aware Enforcement Logic for Appropriately Invoking Network Coding, *IEEE/ACM Transactions on Networking*, 24(4):2005-2018, Aug. 2016.
84. Holbert*, B., S. Tati*, S. Silvestri, T. F. La Porta, A. Swami. September 2015. Network Topology Inference with Partial Information. *IEEE Transactions on Network and Service Management* 12(3):406-419.
85. S. Silvestri, N. Bartolini, S. Ciavaralla, T.F. La Porta, "On the Vulnerabilities of Voronoi-based Approaches to Mobile Sensor Deployment," *IEEE Transactions on Mobile Computing*, 15(12), 2016.
86. R. Ramanathan, E. Ciftcioglu, A. Samanta, R. Urgaonkar, T. F. La Porta, "Symptotics: A Framework for Estimating the Scalability of Real-World Wireless Networks," *ACM/Springer Wireless Networks Journal*, DOI 10.1007/s11276-016-1204-4, to appear.
87. N. Bartolini, S. Ciavarella, T. F. La Porta, S. Silvestri, "On Critical Service Recovery After Massive Network Failures," *IEEE/ACM Transactions on Network*, 25(4):2235 – 2249, August, 2017.
88. N. Bartolini, T. Calamoneri, S. Ciavarella, T. F. La Porta, S. Silvestri, "Autonomous Mobile Sensor Placement in Complex Environments," *ACM Transactions on Autonomous and Adaptive Systems*, to appear.

89. T.A. Dao, A.K. Roy-Chowdhury, H. Madhyastha, S. Krishnamurthy, T.F. La Porta, "Managing Redundant Content in Bandwidth Constrained Wireless Networks, IEEE/ACM Transactions on Networking, 25(2): 988 – 1003, April, 2017.
90. M. Lin, S. Silvestri, N. Bartolini, T.F. La Porta, "Selective Activation in Dense Femtocell Networks," IEEE Transactions on Wireless Communications, 15(10):7018-7029.
91. H. Khamfroush, N. Bartolini, T.F. La Porta, A. Swami, J. Dillman, "On Propagation of Phenomena in Interdependent Networks," IEEE Transactions on Network Science and Engineering, 3(4):225 – 239, Oct-Dec, 2016.
92. Z. Lu, G. Cao, T.F. La Porta, "TeamPhone: Networking Smart Phone for Disaster Recovery," IEEE Transaction on Mobile Computing, to appear.
93. D. Z. Tootaghaj, T. He, T.F. La Porta, "Parsimonious Tomography: Optimizing Cost-Identifiability Trade-off for Probing-based Network Monitoring," ACM Performance Evaluation Review (PER), 45 (2), 107-110, 2018.
94. S. Rager, E. Ciftioglu, R. Ramanathan, T.F. La Porta, R. Govindan, "Scalability and Satisfiability of Quality-of-Information in Wireless Networks," IEEE/ACM Transactions on Networking, 10.1109/TNET.2017.2781202, 26 (1), 398-411, 2018.
95. Z. Lu, X. Sun, Xiao, T. F. La Porta, "Cooperative Data Offload in Opportunistic Networks: From Mobile Devices to Infrastructure," IEEE/ACM Transactions on Networking, Digital Object Identifier: 10.1109/TNET.2017.2747621, 25(6):3382-3395, December, 2017.
96. S. Achleitner, T.F. La Porta, P. McDaniel, S. Sugrim, S.V. Krishnamurthy, R. Chada, "Deceiving Network Reconnaissance Using SDN-based Virtual Topologies," IEEE Transactions on Network and Service Management, DOI: 10.1109/TNSM.2017.2724239, 14(4): 1098-1112, December, 2017.
97. S. Achleitner, N. Bartolini. T. He, T.F. La Porta, D. Tootaghaj, "Fast Network Configuration in Software Defined Networks," IEEE Transactions on Network and Service Management, DOI 10.1109/TNSM.2018.2874051, 15 (4), 1249-1263, 2018.
98. D. Tootaghaj, N. Bartolini, H. Khamfroush, T. He, N. Ray Chaudhuri, T. La Porta, "Mitigation and Recovery from Cascading Failures in Interdependency Networks Under Uncertainty," IEEE Transactions on Control of Network Systems, DOI:10.1109/TCNS.2018.2843168, 6(2):501-514, June 2019.
99. Z. Lu, K. Chan, S. Pu, T. F. La Porta, "CrowdVision: A Computing Platform for Video Crowdprocessing Using Deep Learning," IEEE Transactions on Mobile Computing, 18(7):1513-1526, DOI: 10.1109/TMC.2018.2864212, July, 2019.
100. D. Tootaghaj, N. Bartolini, H. Khamfroush, T. He, N. Ray Chaudhuri, T. La Porta, On Progressive Network Recovery from Massive Failures under Uncertainty, IEEE Transactions on Network and Service Management, Digital Object Identifier: 10.1109/TNSM.2018.2880155, 16(1): 113-126, March, 2019.
101. A. Atya, Z. Qian, S. Krishnamurthy, T. La Porta, P. McDaniel, L. Marvel, "Catch Me If You Can: A Closer Look at Malicious Co-Residency on the Cloud," IEEE/ACM Transactions on Networking, Digital Object Identifier: 10.1109/TNET.2019.2891528, 27(2):560-576, April, 2019.
102. M. Lin, N. Bartolini, T. F. La Porta, M. Giallorenzo, "On Interference Aware Power Adjustment and Scheduling in Femtocell Networks," IEEE/ACM Transactions on

- Networking, Digital Object Identifier: 10.1109/TNET.2020.2973833, 28(2): 736-749, April, 2020.
103. N. Felemban, F. Mehmeti, H. Khamfroush, Z. Lu, S. Rallapalli. K. Chan, T.F. La Porta, "PicSys: Energy-Efficient Fast Image Search on Distributed Mobile Networks," IEEE Transactions on Mobile Computing, Digital Object Identifier: 10.1109/TMC.2019.2963150, 20(4):1574-1589, April, 2021.
 104. Z. Lu, K. Chan, R. Uргаonkar, S. Pu, T. F. La Porta, "NetVision: On-demand Video Processing in Wireless Networks," IEEE/ACM Transactions on Networking, 28(1): 196-209, Digital Object Identifier: 10.1109/TNET.2019.2954909, February, 2020.
 105. Y. Cao, A. Osama, S. Singh, Z. Qian, S. Krishnamurthy, T.F. La Porta, P. Mohapatra, L. Marvel, "Packet Header Obfuscation Using MIMO," IEEE/ACM Transactions on Networking, 28(4): 1712-1725, August 2020.
 106. Z. Lu, S. Rallapalli, K. Chan, S. Pu, T. F. La Porta, "Augur: Modeling the Resource Requirements of ConvNets on Mobile Devices," IEEE Transactions on Mobile Computing, DOI: 10.1109/TMC.2019.2946538, 20(2):352-365, Feb, 2021
 107. S. Achleitner, Q. Burke, P. McDaniel, T. Jaeger, T.F. La Porta, S.Krishnamurthy, "MLSNNet: A Policy Complying Multilevel Security Framework for Software Defined Networking," IEEE Transactions on Network and Service Management, Digital Object Identifier: 10.1109/TNSM.2020.3045998, 18(1):729-744, March, 2021.
 108. V. Farhadi, T. He, T. F. La Porta, H. Khamfroush, S. Wang, K. Chan, K Poularakis, "Service Placement and Request Scheduling for Data-intensive Applications in Edge Clouds," IEEE/ACM Transactions on Networking, Digital Object Identifier: 10.1109/TNET.2020.3048613, 29(2):779-792, April 2021.
 109. F. Mehmeti, T.F. La Porta, "Reducing the Cost of Consistency: Performance Improvements in Next Generation Cellular Networks with Optimal Resource Reallocation," IEEE Transactions on Mobile Computing, Digital Object Identifier: 10.1109/TMC.2020.3039757, 2020, to appear.
 110. X. Chen, T. Tan, G. Cao, T.F. La Porta, "Context-Aware and Energy-Aware Video Streaming on Smartphones," IEEE Transactions on Mobile Computing, Digital Object Identifier: 10.1109/TMC.2020.3019341, 2020, to appear.
 111. S. Gharebaghi, N. Ray Chaudhuri, S. G. Vennelaganti, T. He, T. F. La Porta, "Inclusion of Pre-Existing Undervoltage Load Shedding Schemes in AC-QSS Cascading Failure Models," IEEE Transactions on Power Systems, 36(6): 5645-5656 Digital Object Identifier: 10.1109/TPWRS.2021.3075210, November, 2021.
 112. Q. Burke, P.McDaniel,T. La Porta, M. Yu, T. He, Misreporting Attacks in Software-Defined Networking," Springer Mobile Networks and Applications, to appear.
 113. Y. Huang, T. He, N. Chaudhuri, T.F. La Porta, "Preventing Outages under Coordinated Cyber-Physical Attack with Secured PMUs," IEEE Transactions on Smart Grid, 13(4): 3160-3173, Digital Object Identifier: 10.1109/TSG.2022.3165768, July, 2022.
 114. E. Goshi, F. Mehmeti, T.F. La Porta, W. Kellerer, "Modeling and Analysis of mMTC Traffic in 5G Core Networks," IEEE Transactions on Network and Service Management, DOI: 10.1109/TNSM.2024.3481240, accepted.
 115. I. Barclay, C. Simpkin, G. Bent, T. La Porta, D. Millar, A. Preece, I. Taylor and D. Verma, "Trustful Service Discovery for Highly Dynamic Decentralized

- Workflows,” *Future Generation Computer Systems*, Elsevier, September, 2022
(Editor’s Choice Award).
116. V. Farhadi, S. Gopal Vennelaganti, T. He, N. Ray Chaudhuri, T. La Porta, “Improvement of SCADA-based Preventive Control Under Budget Constraints,” *IEEE Transactions on Network Science and Engineering*, Digital Object Identifier: 10.1109/TNSE.2022.3166926, to appear.
 117. Burke, F. Mehmeti, K. Ostrowski, T. Jaeger, T.F. La Porta, P. McDaniel, “Enforcing Multilevel Security Policies in Unstable Networks,” *IEEE Transactions on Network and Service Management*, Digital Object Identifier: 10.1109/TNSM.2022.3176820, 19(3): 2349 – 2365, Sept. 2022.
 118. Y. Huang, T. He, N.R. Chaudhuri, T. La Porta, “Link State Estimation under Cyber-Physical Attacks: Theory and Algorithms,” *IEEE Transactions on Smart Grid*, Digital Object Identifier: 10.1109/TSG.2022.3171169, 13(5): 3760-3773, Sept., 2022.
 119. K. Wheatman, F. Mehmeti, M. Mahon, T.F. La Porta, “Optimal Resource Allocation for Crowdsourced Image Processing,” *IEEE Transactions on Mobile Computing*, Digital Object Identifier: 10.1109/TMC.2022.3182317, vol. 22, no. 10, pp. 6110-6125, 1 Oct. 2023.
 120. N. Felemban, F. Mehmeti, T.F. La Porta, “VidQ: Video Query Using Optimized Audio-Visual Processing,” *IEEE/ACM Transactions on Networking*, 31(3): 1338-1352, Digital Object Identifier: 10.1109/TNET.2022.3215601, June 2023.
 121. K. Wheatman, F. Mehmeti, M. Mahon, T.F. La Porta, G. Cao, “EQMS: An Improved Energy-Aware and QoE-Aware Video Streaming Policy across Multiple Competitive Mobile Devices,” *Wireless Networks*, DOI: 10.1007/s11276-022-03199-z, Springer, April 2023.
 122. S. Gharebaghi, N. Chaudhuri, T. He, T.F. La Porta, “An Approach for Fast Cascading Failure Simulation in Dynamic Models of Power Systems,” *Applied Energy*, Feb., 2023.
 123. N. Felemban, F. Mehmeti, T.F. La Porta, H. Kwon, “EDIR: Efficient Distributed Image Retrieval of Novel Objects in Mobile Networks,” *IEEE Transactions on Mobile Computing*, DOI: 10.1109/TMC.2023.3257268 vol. 23, no. 3, pp. 2337-2350, March 2024.
 124. F. Mehmeti, T.F. La Porta, W. Kellerer, “Efficient Resource Allocation with Provisioning Constrained Rate Variability in Cellular Networks,” *IEEE Transactions on Mobile Computing*, vol. 23, no. 5, pp. 5130-5149, May 2024.
 125. S. Gharebaghi, N. Chaudhuri, T. He, T.F. La Porta, “Dynamic Modeling and Mitigation of Cascading Failures in Power Grids with Interdependent Cyber and Physical Layers,” *IEEE Transactions on Smart Grid*, accepted, Digital Object Identifier: 10.1109/TSG.2023.3338181, vol 15, no. 3, pp. 3235-3247, May, 2024.
 126. M. Yu, Q. Burke, T. F. La Porta, P. McDaniel, “Stealthy Misreporting Attacks Against Load Balancing,” *IEEE/ACM Transactions on Networking*, Digital Object Identifier: 10.1109/TNET.2024.3396387, 32(4): 3622-3635, August 2024.
 127. F. Mehmeti, A. Papa, W. Kellerer, T. F. La Porta, “Minimizing Rate Variability with Effective Resource Utilization in Cellular Networks,” *IEEE Transactions on Mobile Computing*, vol 23, no. 12, pp. 11061 – 11079, Dec., 2024.
 128. Q. Burke, Y. Beugin, B. Hoak, R. King, E. Pauley, R. Sheatsley, M. Yu, T. He, T. F. La Porta, P. McDaniel, “Securing Cloud File Systems with Trusted Execution,”

- IEEE Transactions on Dependable and Secure Computing, vol. 22, no. 03, pp. 1976-1992, May-June 2025.
129. A. Rublein, F. Mehmeti, M. Mahon, T.F. La Porta, "Improved Methods of Task Assignment and Resource Allocation with Preemption in Edge Computing Systems," IEEE Transactions on Parallel and Distributed Systems, vol 36., no. 9, 1857-1871, Sept, 2025.
 130. F. Mehmeti, S. Ayvasik, F. Kaynar, T. La Porta, W. Kellerer, "Constant Payout Rates: Resource Allocation for Improved User Experience with Live Video Streaming in 5G," Elsevier Computer Networks, accepted, 2025.
 131. C. Guan, G. Cao, T.F. La Porta, J. Acosta, "Learning-Based IoT Honeypots for Cyber Deception," IEEE Security and Privacy, accepted, 2025.

Conference Proceedings

132. La Porta, T. F., M. Schwartz. December 1991. Architectures, Features, and Implementation of High-Speed Transport Protocols. *Proceedings of the IEEE Global Telecommunications Conference (GLOBECOM 1991)*. pp. 1717-1721. Phoenix, AZ.
133. La Porta, T. F., M. Schwartz. December 1992. A High-Speed Protocol Parallel Implementation: Design and Analysis. *Proceedings of the Fourth International Conference on High Performance Networking (HPN 1992)*. pp. 135-150. Liege, Belgium.
134. La Porta, T. F., M. Schwartz. May 1993. A Highly Flexible High-Speed Transport Protocol: Functionality and Performance. *Proceedings of IEEE International Conference on Communications (ICC 1993)*. pp. 182-186. Geneva, Switzerland.
135. La Porta, T. F., M. Schwartz. March 28-April 1, 1993. Performance Analysis of MSP: A Feature-Rich High-Speed Transport Protocol. *Proceedings of INFOCOM 1993*. pp. 513-520. San Francisco, CA.
136. Veeraraghavan, M., T. F. La Porta. June 1993. Homogeneous Signaling for ATM, LANS, MANS, and WANS. *Proceedings of the Second International Conference on Computer Communications and Networks (ICCCN 1993)*. pp. 54-57. San Diego, CA.
137. La Porta, T. F., M. Veeraraghavan. November 1993. Functional Signaling Architecture for Broadband Networks. *Proceedings of the IEEE Global Telecommunications Conference (GLOBECOM 1993)*. pp. 1012-1016. Houston, TX.
138. Veeraraghavan, M., T. F. La Porta. September 27-October 1, 1993. Signaling Models for Control of B-ISDN and IN Services. *Proceedings of the IEEE International Symposium on Subscriber Loops and Services (ISSLS 1993)*. pp. 198-203. Vancouver, Canada.
139. La Porta, T. F., M. Veeraraghavan. May 1994. Designing and Implementation of a Distributed Call Processing Architecture. *Proceedings of the 1994 International Conference on Communications (ICC 1994)*. pp. 278-282. New Orleans, LA.
140. La Porta, T. F., M. Veeraraghavan. April 1995. An Experimental Signaling Architecture and Modular Signaling Protocols. *Proceedings of International Switching Symposium (ISS 1995)*. Berlin, Germany.

141. Veeraraghavan, M., T. F. La Porta, W. S. Lai. April 1995. An Alternative Approach to Call/Connection Control in Broadband Switching Systems. *Proceedings of IEEE BSS 1995*. Poznan, Poland.
142. Paul, S., E. Ayanoglu, T. F. La Porta, K. K. Sabnani, R. D. Gitlin. April 1995. An Asymmetric Protocol for a Wireless Link. *Proceedings of IEEE INFORCOM 1995*. pp. 1053-1062. Boston, MA.
143. Qin, Z., M. Veeraraghavan, T. F. La Porta. November 1995. An Improved Mobile Tracking and Location Procedure for ATM-Based PCNs. *Proceedings of IEEE Globecom 1995*. pp. 6-11. Singapore.
144. La Porta, T. F., M. Veeraraghavan. June 1995. Direct Signaling: A New Access Signaling Architecture. *Proceedings of IEEE ICC 1995*. pp. 93-98. Seattle, WA.
145. Veeraraghavan, M., T. F. La Porta, R. Ramjee. 1995. A Distributed Control Strategy for Wireless ATM Networks. *Proceedings of IEEE ICC 1995*, published in *ACM/Baltzer Wireless Networks Journal* 1(3):323-339.
146. Woo, T., T. F. La Porta, K. K. Sanbani. 1997. Pigeon: A Wireless Two-Way Messaging System. *Proceedings of the Seventh International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC 1996)*. pp. 693-697. Taiwan.
147. Veeraraghavan, M., T. F. La Porta, R. Ramjee. February 1996. User Signaling Servers for ATM-Based PCS Networks. *Proceedings of the International Symposium on Subscriber Loops and Services (ISSLS 1996)*. pp. 163-169. Melbourne, Australia.
148. La Porta, T. F., A. Sawkar, W. Strom. 1997. The Role of Technology in Wireless Access Network Evolution. *Proceedings of ISS 1997*.
149. Sabnani, K. K., T. Woo, T. F. La Porta. September 1997. A System for Wireless Data Services. *Proceedings of the Eighth International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC 1997)*. pp. 205-229. Helsinki, Finland. (Invited)
150. Woo, T., T. F. La Porta, K. K. Sabnani. October 1997. User Agents and Flexible Messages: A New Approach to Wireless Two-Way Messaging. *Proceedings of the IEEE International Conference on Network Protocols (ICNP 1997)*. pp. 53-62. Atlanta, GA.
151. Woo, T., T. F. La Porta, J. Golestani, N. Agarwal. March 29-April 2, 1998. Update and Search Algorithms for Wireless Two-Way Messaging: Design and Performance. *Proceedings of INFOCOM 1998*. pp. 737-747. San Francisco, CA.
152. Ramjee, R., T. F. La Porta, J. F. Kurose, D. F. Towsley. March 29-April 2, 1998. User Agent Migration Policies in Multimedia Wireless Networks. *Proceedings of INFOCOM 1998*. pp. 1147-1155. San Francisco, CA.
153. La Porta, T. F., R. Ramjee, K. Murakami, Y-J. Lin, R. Buskens. September 1998. Cluster Mobile Switching Center for Third Generation Wireless Systems. *Proceedings of the Ninth International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC 1998)*. 1:121-125. Boston, MA. (Invited)
154. Murakami, K., R. W. Buskens, R. Ramjee, Y-J. Lin, T. F. La Porta. June 1998. Design, Implementation, and Evaluation of Highly Available Distributed Call Processing Systems. *Proceedings of the 28th International Symposium on Fault-Tolerant Computing (FTCS 1998)*. pp. 118-127. Munich, Germany.

155. La Porta, T. F., D. Lee, Y-J. Lin, M. Yannakakis. November 1998. Protocol Feature Interactions. *Proceedings of the Joint International Conference on Formal Description Techniques for Distributed Systems and Communication Protocols (FORTE1998)*. pp. 59-74. Paris, France.
156. La Porta, T. F., L. Salgarelli, G. Foster. September 1999. Mobile IP and Wide Area Wireless Data. *Proceedings of the Wireless Communications and Networking Conference (WCNC 1999)*. pp. 1528-1532. New Orleans, LA.
157. Ramjee, R., T. F. La Porta, S. Thuel, K. Varadhan, S. Y. Wang. October 31-November 3, 1999. HAWAII: A Domain-based Approach for Supporting Mobility in Wide-Area Wireless Networks. *Proceedings of the Seventh International Conference on Network Protocols (ICNP 1999)*. pp. 283-292. Toronto, Canada.
158. Lennox, J., K. Murakami, M. Karaul, T. F. La Porta. March 2000. Interworking Internet Telephony and Wireless Telecommunications Networks. *Proceedings of the IEEE Workshop on IP Telephony (IPTel 2000)*. New York, NY.
159. La Porta, T. F., K. Murakami, R. Ramjee. September 2000. RIMA: Router for Integrated Mobile Access. *Proceedings of the Eleventh International Symposium on Personal, Indoor, and Mobile Radio Communications (PIMRC 2000)*. pp. 315-321. London, England.
160. Ramjee, R., L. Li, T. F. La Porta, S. Kasera. July 2001. IP Paging Service for Mobile Hosts. *Proceedings of the Seventh Annual International Conference on Mobile Computing and Networking (Mobicom 2001)*. pp. 332-345. Rome, Italy.
161. Kasera, S., J. Pinheiro, C. Loader, M. Karaul, A. Hari, T. F. La Porta. November 2001. Fast and Robust Signaling Overload Control. *Proceedings of the Ninth International Conference on Network Protocols (ICNP 2001)*. pp. 323-331. Riverside, CA.
162. Wang*, G., W. Zhang, G. Cao, T. F. La Porta. October 2003. On Supporting Distributed Collaboration in Sensor Networks. *Proceedings of the IEEE Military Communications Conference (MILCOM 2003)*. pp. 752-757. Boston, MA.
163. Tarnacha, A., T. F. La Porta. October 2003. E-STROBE: An Adaptive Beacon Activation Algorithm for Sensor Location. *Proceedings of the IEEE Semiannual Vehicular Technology Conference (VTC 2003)*. Proceedings on CD-ROM. Orlando, FL.
164. Zhang, W., G. Cao, T. F. La Porta. November 2003. Data Dissemination with Ring-Based Index for Sensor Networks. *Proceedings of the IEEE International Conference on Network Protocols (ICNP 2003)*. pp. 305-314. Atlanta, GA. (Acceptance ratio is about 15%)
165. Wang*, G., G. Cao, T. F. La Porta. November 2003. A Bidding Protocol for Deploying Mobile Sensors. *Proceedings of the IEEE International Conference on Network Protocols (ICNP 2003)*. pp. 315-324. Atlanta, GA. (Acceptance ratio is about 15%)
166. Wang*, G., G. Cao, T. F. La Porta. March 2004. Movement-Assisted Sensor Deployment. *Proceedings of IEEE INFOCOM 2004*. pp. 2469-2479. Hong Kong. (First author supervised by candidate) (Acceptance ratio is about 18%)
167. Zhang, W., G. Cao, T. F. La Porta. October 2004. Dynamic Proxy Tree-Based Data Dissemination Schemes for Wireless Sensor Networks. *Proceedings of the First IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS 2004)*. pp. 21-30. Fort Lauderdale, FL.
168. Wang*, G., G. Cao, T. F. La Porta. October 2004. Proxy-Based Sensor Deployment for Mobile Sensor Networks. *Proceedings of the First IEEE International*

- Conference on Mobile Ad-hoc and Sensor Systems (MASS 2004)*. pp. 493-502. Fort Lauderdale, FL. (First author supervised by candidate)
169. Wang*, G., G. Cao, T. F. La Porta, W. Zhang. March 2005. Sensor Relocation in Mobile Sensor Networks. *Proceedings of IEEE INFOCOM 2005*. pp. 2302-2312. Miami, FL. (First author supervised by candidate)
 170. Choi*, H., H. Song, G. Cao, T. F. La Porta. March 2005. Mobile Multi-Layered IPsec. *Proceedings of IEEE INFOCOM 2005*. pp. 1929-1939. Miami, FL. (First two authors supervised by candidate)
 171. Choi*, H., H. Song, G. Cao, T. F. La Porta. April 2005. Mobile IPsec. *Proceedings of the IEEE Communications, Quality, and Reliability Workshop (CQR 2005)*. pp. 78-84. St. Pete Beach, FL. (First author supervised by candidate)
 172. Kotapati*, K., P. Liu, Y. Sun*, T. F. La Porta. May 2005. A Taxonomy of Cyber Attacks on 3G Networks. *Proceedings of the IEEE International Conference on Intelligence and Security Informatics (ISI 2005)*. Springer-Verlag LNCS 3495(1):631-633. Atlanta, GA. (First and third authors supervised by candidate)
 173. Choi*, H., W. Enck, J. Shin*, P. McDaniel, T. F. La Porta. July 2005. Secure Reporting of Traffic Forwarding Activity in Mobile Ad Hoc Networks. *Proceedings of the Second Annual International Conference on Mobile and Ubiquitous Systems: Networking and Services (MobiQuitous 2005)*. pp. 12-21. San Diego, CA. (First and third authors supervised by candidate)
 174. Wang*, G., M. J. Irwin, P. Berman, H. Fu, T. F. La Porta. August 2005. Optimizing Sensor Movement Planning for Energy Efficiency. *Proceedings of the International Symposium on Low Power Electronics and Design (ISLPED 2005)*. pp. 215-220. San Diego, CA. (First author co-supervised by candidate)
 175. Kasera, S., J. Pinheiro, C. Loader, M. Karaul, A. Hari, T. F. La Porta. November 2005. Robust Multiclass Signaling Overload Control. *Proceedings of the Thirteenth IEEE International Conference on Network Protocols (ICNP 2005)*. pp. 246-258. Boston, MA.
 176. Enck, W., P. Traynor*, P. McDaniel, T. F. La Porta. November 2005. Exploiting Open Functionality in SMS-Capable Cellular Networks. *Proceedings of the Twelfth ACM Conference on Computer and Communications Security (CCS 2005)*. pp. 393-404. Alexandria, VA. (Second author co-supervised by candidate)
 177. Sun*, Y., P. Liu, P. Kermani, T. F. La Porta. December 2005. An Architecture and Key Management Approach for Maintaining Privacy in Location Based Group Services. *Proceedings of the First International Conference on Collaborative Computing: Networking, Applications, and Worksharing (CollaborateCom 2005)*. Proceedings on CD-ROM. San Jose, CA. (First author supervised by candidate)
 178. Traynor*, P., G. Cao, T. F. La Porta. April 2006. The Effects of Probabilistic Key Management on Secure Routing in Sensor Networks. *Proceedings of the IEEE Wireless Communications and Networking Conference (WCNC 2006)*. pp. 659-664. Las Vegas, NV. (First author co-supervised by candidate)
 179. Traynor*, P., H. Choi*, G. Cao, S. Zhu, T. F. La Porta. April 2006. Establishing Pair-Wise Keys in Heterogeneous Sensor Networks. *Proceedings of IEEE INFOCOM 2006*. 25(1): 2073-2084. Barcelona, Spain. (First author co-supervised and second author supervised by candidate)
 180. Kotapati*, K., P. Liu, T. F. La Porta. May 2006. CAT – A Practical Graph & SDL Based Toolkit for Vulnerability Assessment of 3G Networks. *Proceedings of the*

- Twenty-First IFIP International Information Security Conference (SEC 2006)*. pp. 158-170. Karlstad, Sweden. (First author supervised by candidate)
181. Shin*, J., T. F. La Porta. June 2006. Hybrid Wireless Networks. *Proceedings of the Fifth Annual Mediterranean Ad Hoc Networking Workshop (Med-Hoc-Net 2006)*. Proceedings on CD-ROM. Lipari, Sicily, Italy. (First author supervised by candidate)
 182. Traynor*, P., R. Kumar*, H. B. Saad*, G. Cao, T. F. La Porta. June 2006. LIGER: Implementing Efficient Hybrid Security Mechanisms for Heterogeneous Sensor Networks. *Proceedings of the Fourth International Conference on Mobile Systems, Applications, and Services (MobiSys 2006)*. pp. 15-27. Upsalla, Sweden. (First author co-supervised, second and third authors supervised by candidate)
 183. Traynor*, P., J. Shin*, B. Madan, S. Phoha, T. F. La Porta. September 2006. Efficient Group Mobility for heterogeneous Sensor Networks. *Proceedings of the IEEE Vehicular Technology Conference (VTC 2006)*. 6 pages. Montreal, Canada. (First two authors supervised by candidate)
 184. Traynor*, P., W. Enck, P. McDaniel, T. F. La Porta. September 2006. Mitigating Attacks on Open Functionality in SMS-Capable Cellular Networks. *Proceedings of the Twelfth Annual International Conference on Mobile Computing and Networking (Mobicom 2006)*. pp. 182-193. Los Angeles, CA. (First author co-supervised by candidate)
 185. Rowaihy*, H., S. Eswaran*, P. Johnson, T. Brown, A. Barnoy, D. Verma, T. F. La Porta. April 2007. A Survey of Sensor Selection Schemes in Wireless Sensor Networks. *Proceedings of the SPIE Unattended Ground, Sea, and Air Sensor Technologies and Applications IX Conference* 6562:65621A1-A13. Orlando, FL. (First two authors supervised by candidate)
 186. Brown, T., A. Barnoy, D. Verma, P. Johnson, H. Rowaihy*, T. F. La Porta, D. Sarioz. April 2007. Geometric Considerations for Optimally Placing Sensors in a Field. *Proceedings of the SPIE Unattended Ground, Sea, and Air Sensor Technologies and Applications IX Conference*. 9 pages. Orlando, FL. (Fifth author supervised by candidate)
 187. Rowaihy*, H., W. Enck, P. McDaniel, T. F. La Porta. May 2007. Limiting Sybil Attacks in Structured Peer-to-Peer Networks. *Proceedings of the Twenty-Sixth Annual IEEE Conference on Computer Communications (INFOCOM 2007) Mini-Symposium on Security, Streaming, and Overlays*. pp. 2596-2600. Anchorage, Alaska. (First author supervised by candidate)
 188. Choi*, H., T. F. La Porta, P. McDaniel. June 2007. Privacy Preserving Communication in MANETs. *Proceedings of Fourth Annual IEEE Communications Society Conference on Sensor, Mesh, and Ad Hoc Communications and Networks (SECON 2007)*. pp. 233-242. San Diego, CA. (First author supervised by candidate)
 189. Bar-Noy, A., T. Brown, M. Johnson, T. F. La Porta, O. Liu, H. Rowaihy*. July 2007. Assigning Sensors to Missions with Demands. *Proceedings of the Third International Workshop on Algorithmic Aspects of Wireless Sensor Networks (ALGOSENSORS 2007)*. Springer-Verlag LNCS 4837:114-125. Wroclaw, Poland.
 190. Traynor*, P., P. McDaniel, T. F. La Porta. August 2007. On Attack Causality in Internet-Connected Cellular Networks. *Proceedings of the Sixteenth USENIX Security Symposium (SECURITY 2007)*. pp. 307-322. Boston, MA. (First author co-supervised by candidate)

191. Choi*, H., S. Zhu, T. F. La Porta. September 2007. SET: Detecting Node Clones in Sensor Networks. *Proceedings of the Third International Conference on Security and Privacy in Communication Networks (SecureComm 2007)*. 10 pages. Proceedings on CD-ROM. Nice, France. (First author supervised by candidate)
192. Venkateswaran, A., V. Sarangan, T. F. La Porta, R. Acharya. October 2007. A Mobility Prediction Based Relay Deployment Framework for Conserving Power in MANETs. *Proceedings of the Tenth ACM International Workshop on Modeling Analysis and Simulation of Wireless and Mobile Systems (MSWiM 2007)*. pp. 209-216. Crete Island, Greece.
193. Shin*, J., R. Kumar, T. F. La Porta. October 2007. Relay Based Multi-hop Access to Wireless Mesh Networks. *Proceedings of the Fourth IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS 2007)*. Proceedings on CD-ROM. 3 pages. Pisa, Italy. (First author supervised by candidate) (Poster presentation)
194. Teng, J., G. Cao, T. F. La Porta. October 2007. Sensor Relocation with Mobile Sensors: Design, Implementation, and Evaluation. *Proceedings of the Fourth IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS 2007)*. Proceedings on CD-ROM. 9 pages. Pisa, Italy.
195. Eswaran*, S., A. Misra, T. F. La Porta, K. Leung. March 2008. Providing Rapid Adaptation for Dynamic Missions in Mobile, Wireless Sensor Environments. *Proceedings of the SPIE Defense and Security Symposium*. Volume 6981. 12 pages. Orlando, FL. (First author supervised by candidate)
196. Preece, A., M. Gomez, G. de Mel, W. Vasconcelos, D. Sleeman, S. Colley, G. Pearson, T. F. La Porta. March 2008. Matching Sensors to Missions Using a Knowledge-based Approach. *Proceedings of the SPIE Defense and Security Symposium*. Volume 6981. 12 pages. Orlando, FL.
197. Shin*, J., R. Kumar*, T. F. La Porta, Y. Shin. March 31-April 3, 2008. Multi-hop Wireless Relay Networks of Mesh Clients. *Proceedings of the IEEE Wireless Communications & Networking Conference (WCNC 2008)*. pp. 2717-2722. Las Vegas, NV. (First two authors supervised by candidate)
198. Kumar*, R., H. Choi*, J. Shin*, T. F. La Porta. April 2008. Channelization for Network Coding in Wireless Networks. *Proceedings of the Twenty Seventh Conference on Computer Communications (IEEE Infocom 2008)*. pp. 366-370. Phoenix, AZ. (First three authors supervised by candidate)
199. Sun*, Y., F. Chen*, T. F. La Porta. May 2008. Multiple Backhaul Mobile Access Router: Design and Experimentation. *Proceedings of the IEEE International Conference on Communications (ICC 2008)*. pp. 4543-4548. Beijing, China. (First two authors supervised by candidate)
200. Johnson, M., H. Rowaihy*, D. Pizzocaro, A. Bar-Noy, S. Chalmers, T. F. La Porta, A. Preece. June 2008. Frugal Sensor Assignment. *Proceedings of the Fourth IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2008)*. Springer-Verlag LNCS 5067:219-236. Santorini Island, Greece. (Second author supervised by candidate)
201. Kotapati*, K., P. Liu, T. F. La Porta. June 2008. "EndSec" An End-to-End Message Security Protocol for Mobile Telecommunication Networks. *Proceedings of First IEEE Workshop on Security, Privacy and Authentication in Wireless Networks*

- (SPAWM), held in conjunction with *IEEE WoWMoM 2008*. pp. 1-7. Newport Beach, CA. (First author supervised by candidate)
202. Alayev, Y., A. Bar-Noy, T. F. La Porta. June 2008. Broadcasting Info-Pages to Sensors: Efficiency vs. Energy Conservation. *Proceedings of IEEE SECON 2008*. pp. 368-376. San Francisco, CA.
 203. Eswaran*, S., A. Misra, T. F. La Porta. June 2008. Utility-Based Adaptation in Mission-oriented Wireless Sensor Networks. *Proceedings of IEEE SECON 2008*. pp. 278-286. San Francisco, CA. (First author supervised by candidate)
 204. Shao, M., S. Zhu, G. Cao, T. La Porta, P. Mohapatra. September 2008. A Cross-layer Dropping Attack in Video Streaming over Ad Hoc Networks. *Proceedings of the Fourth International Conference on Security and Privacy in Communication Networks (SecureComm 2008)*. Proceedings on CD-ROM. 8 pages. Istanbul, Turkey.
 205. Tichogiorgos, J., K. Leung, A. Misra, T. F. La Porta. September 2008. Distributed Network Utility Optimization in Wireless Sensor Networks Using Power Control. *Proceedings of IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2008)*. 6 pages. Cannes, France.
 206. Alayev, Y., A. Bar-Noy, F. Chen*, I. Fermin, T. F. La Porta, A. G. Pearson, T. Pham. September 2008. A System Architecture for Filtering and Disseminating Data in Sensor Networks. *Proceedings of the Fifth SPIE European Symposium on Optics/Photonics in Security and Defence, Unmanned/Unattended Sensors and Sensors Networks V*. Volume 7112. 9 pages. Cardiff, Wales. (Third author supervised by candidate)
 207. Gomez, M., A. Preece, M. Johnson, G. de Mel, W. Vasconcelos, A. Bar-Noy, T. F. La Porta, D. Pizzocaro, H. Rowaihy*. September 2008. A Knapsack Approach to Sensor-mission Assignment with Uncertain Demands. *Proceedings of the Fifth SPIE European Symposium on Optics/Photonics in Security and Defence, Unmanned/Unattended Sensors and Sensors Networks V*. Volume 7112. 12 pages. Cardiff, Wales. (Ninth author supervised by candidate)
 208. Gomez, M., A. Preece, M. Johnson, G. de Mel, W. Vascencelos, C. Gibson, A. Bar-Noy, K. Borowiecki, T. F. La Porta, D. Pizzocaro, H. Rowaihy*, G. Pearson, T. Pham. September 29-October 3, 2008. An Ontology-Centric Approach to Sensor-Mission Assignment. *Proceedings of the Sixteenth International Conference on Knowledge Engineering and Knowledge Management (EKAW 2008)*. pp. 347-363. Catania, Italy. (Eleventh author supervised by candidate)
 209. Rowaihy*, H., M. Jonson. S. Eswaran*, D. Pizzocaro, A. Bar-Noy, T. F. La Porta, A. Misra, A. Preece. October 2008. Utility-Based Joint Sensor Selection and Congestion Control for Task-Oriented WSNs. *Proceedings of IEEE Asilomar*. 5 pages. Monterey, CA. (First and third authors supervised by candidate)
 210. Gomez, M., A. Preece, M. Johnson, G. de Mel, W. Vascencelos, A. Bar-Noy, K. Borowiecki, T. F. La Porta, D. Pizzocaro, H. Rowaihy*, G. Pearson, T. Pham. November 2008. Reasoning and Resource Allocation for Sensor-Mission Assignment in a Coalition Context. *Proceedings of MILCOM 2008*. 7 pages. San Diego, CA. (Tenth author supervised by candidate)
 211. Lin*, M., H. Rowaihy*, T. Bolbrock*, G. Cao, T. F. La Porta. November 30-December 4, 2008. Data Collection Using RFID and a Mobile Reader. *Proceedings of IEEE Globecom 2008*. pp. 741-746. New Orleans, LA. (First three authors supervised by candidate)

212. Rowaihy*, H., M. Johnson, A. Bar Noy, T. Brown, T. F. La Porta. November 30-December 4, 2008. Assigning Sensors to Competing Missions. *Proceedings of IEEE Globecom 2008*. pp. 44-49. New Orleans, LA. (First author supervised by candidate)
213. Misra, A., S. Eswaran*, T. F. La Porta. January 2009. Control-Theoretic, Mission-Driven, Optimization Techniques for Wireless Sensor Networks. *Proceedings of the Third Workshop on Intelligent Networks: Adaption, Communication & Reconfiguration (IAMCOM 2009)*. Proceedings on CD-ROM. 8 pages. Bangalore, India. (Second author supervised by candidate)

214. Rowaihy*, H., M. Johnson, D. Pizzocaro, A. Bar-Noy, L. Kaplan, T. F. La Porta, A. Preece. June 2009. Detection and Localization of Sensor Assignment with Exact and Fuzzy Locations. *Proceedings of the International Conference on Distributed Computing in Sensor Systems (DCOSS 2009)*. Springer-Verlag LNCS 5516:28-43. Marina Del Ray, CA. (First author supervised by candidate)
215. Eswaran*, S., M. Johnson, A. Misra, T. F. La Porta. June 2009. Adaptive In-Network Processing for Bandwidth and Energy Constrained Mission-Oriented Multi-hop Wireless Networks. *Proceedings of the International Conference on Distributed Computing in Sensor Systems (DCOSS 2009)*. Springer-Verlag LNCS 5516:87-102. Marina Del Ray, CA. (First author supervised by candidate)
216. Melervey*, R., Y. Sun*, T. F. La Porta. June 2009. Multiple Backhaul Mobile Access Router Striping. *Proceedings of the IEEE International Conference on Communications (ICC 2009)*. 6 pages. Dresden, Germany. (First two authors supervised by candidate)
217. Eswaran*, S., A. Misra, T. F. La Porta. June 2009. Control-theoretic Optimization of Utility over Mission Lifetimes in Multi-hop Wireless Networks. *Proceedings of the Sixth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2009)*. 9 pages. Rome, Italy. (First author supervised by candidate)
218. Shao, M., W. Hu, S. Zhu, G. Cao, S. Krishnamurthy, T. F. La Porta. June 2009. Cross-layer Enhanced Source Location Privacy in Sensor Networks. *Proceedings of the Sixth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2009)*. 9 pages. Rome, Italy.
219. Chen*, F., M. Johnson, A. Bar-Noy, I. Fermin, T. F. La Porta. June 2009. Proactive Data Dissemination to Mission Sites. *Proceedings of the Sixth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2009)*. 9 pages. Rome, Italy. (First author supervised by candidate)
220. La Porta, T. F., G. Maselli, C. Petrioli. June 2009. Optimal Frame Tuning for Aloha Protocols in RFID Networks. *Proceedings of the Sixth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2009)*. 3 pages. Rome, Italy. (Poster)
221. Yang, Y., S. Zhu, G. Cao, T. F. La Porta. September 2009. An Active Global Attack Model for Sensor Source Location Privacy: Analysis and Countermeasures. *Proceedings of the Fifth International ICST Conference on Security and Privacy in Communication Networks (SecureComm 2009)*. 20 pages. Athens, Greece.
222. Bartolini, N., T. Calamoneri, T. F. La Porta, A. Massini, S. Silvestri. October 2009. Autonomous Deployment of Heterogeneous Mobile Sensors. *Proceedings of the Seventeenth Annual IEEE International Conference on Network Protocols (ICNP 2009)*. pp. 42-51. Princeton, NJ. **(Best paper award)**
223. Chen*, F., M. Johnson, Y. Alayev, A. Bar-Noy. October 2009. Who, When, Where: Timeslot Assignment to Mobile Clients. *Proceedings of the Sixth IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS 2009)*. pp. 90-99. Macau SAR, China. (First author supervised by candidate)
224. Traynor*, P., M. Lin*, M. Ongtang, V. Rao, T. Jaeger, T. F. La Porta, P. McDaniel. November 2009. On Cellular Botnets: Measuring the Impact of Malicious Devices on a Cellular Network Core. *Proceedings of the Sixteenth ACM Conference on Computer and Communications Security (CCS 2009)*. pp. 223-234. Chicago, IL.

- (First author co-supervised and second author supervised by candidate) (Acceptance rate: 18.4%)
225. Kim, T-S., S. Vural, I. Broustis, D. Syrivelis, S. V. Krishnamurthy, T. F. La Porta. March 2010. A Framework for Joint Network Coding and Transmission Rate Control in Wireless Networks. *Proceedings of the IEEE Conference on Computer Communication (INFOCOM 2010)*. pp. 2937-2945. San Diego, CA. (Peer reviewed)
 226. Bartolini, N., T. Calamoneri, T. F. La Porta, S. Silvestri. March 2010. Mobile Sensor Deployment in Unknown Fields. *Proceedings of the IEEE INFOCOM Mini-Symposium on Hardware and Sensors*. pp. 471-475. San Diego, CA. (Peer reviewed)
 227. Chen*, F., M. Johnson, A. Bar-Noy, T. F. La Porta. April 2010. Cooperative Data Dissemination to Mission Sites. *Proceedings of the SPIE Defense Security and Sensing Conference 2010*. 7 pages. Orlando, FL. (First author supervised by candidate)
 228. Eswaran*, S., A. Misra, T. F. La Porta, F. Bergamaschi. April 2010. Implementation of Utility Based Resource Optimization Protocols on ITA Sensor Fabric. *Proceedings of the SPIE Defense Security and Sensing Conference 2010*. 8 pages. Orlando, FL. (First author supervised by candidate)
 229. Lin*, M., H. Choi*, T. F. La Porta. August 2010. Network Integration in 3G and 4G Wireless Networks. *Proceedings of the Fourth IEEE International Workshop on Wireless Mesh and Ad Hoc Networks (WiMAN 2010)*. 8 pages. Zurich, Switzerland. (First two authors supervised by candidate)
 230. Kumar*, R., S. Tati*, F. de Mello, S. V. Krishnamurthy, T. F. La Porta. October 2010. Network Coding Aware Rate Selection in Multi-rate IEEE 802.11. *Proceedings of the Eighteenth IEEE International Conference on Network Protocols (ICNP 2010)*. pp. 99-102. Kyoto, Japan. (First two authors supervised by candidate)
 231. Cirincione, G., R. Govindan, S. Krishnamurthy, T. F. La Porta, P. Mohapatra. October 31-November 3, 2010. Impact of Security Properties on the Quality of Information in Tactical Military Networks. *Proceedings of the IEEE Military Communications Conference (MILCOM 2010)*. pp. 1-6. San Jose, CA.
 232. Bhajat*, A., G. Cao, B. Krishnamachari, T. F. La Porta. October 31-November 3, 2010. Leveraging Social Networks for Key Distribution to Secure Communication in Tactical Military Networks. *Proceedings of the IEEE Military Communications Conference (MILCOM 2010)*. pp. 26-31. San Jose, CA. (First author supervised by candidate)
 233. Alayev, Y., A. Bar-Noy, M. Johnson*, L. M. Kaplan, T. F. La Porta. November 2010. You Can't Get There from Here: Sensor Scheduling with Refocusing Delays. *Proceedings of the IEEE Seventh International Conference on Mobile Adhoc and Sensor Systems (MASS 2010)*. pp. 462-471. San Francisco, CA. (Third author supervised by candidate)
 234. Traynor*, P., J. Schiffman, T. F. La Porta. December 2010. Constructing Secure Localization Systems with Adjustable Granularity Using Commodity Hardware. *Proceedings of the IEEE Global Telecommunications Conference (GLOBECOM 2010)*. 6 pages. Miami, FL. (First author co-supervised by candidate)
 235. Bar-Noy, A., G. Cirincione, R. Govindan, S. Krishnamurthy, T. F. La Porta, P. Mohapatra, M. Neely, A. Yener. March 2011. Quality of Information-Aware Networking for Tactical Military Networks. *Proceedings of the Third International Workshop on Information Quality and Quality of Service for Pervasive Computing (IQ2S 2011)*. pp. 2-7. Seattle, WA.
 236. Chen*, F., D. Pizzacaro, M. Johnson*, A. Preece, A. Bar-Noy, T. F. La Porta. April 2011. Broadcast Scheduling with Data Bundles. *Proceedings of the SPIE Defense,*

- Security, and Sensing 2011*. 8 pages. Orlando, FL. (First and third authors supervised by candidate)
237. Johnson*, M., T. F. La Porta, A. Yener, R. Govindan, K. Spounis, R. Ramanathan. April 2011. Operational Information Content Capacity. *Proceedings of the SPIE Defense, Security, and Sensing 2011*. 7 pages. Orlando, FL. (First author supervised by candidate)
 238. Asterjadhi, A., R. Kumar*, T. F. La Porta, M. Zorzi. June 2011. Broadcasting in Multi Channel Wireless Networks in the Presence of Adversaries. *Proceedings of the Eighth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2011)*. pp. 377-385. Salt Lake City, UT. (Second author supervised by candidate)
 239. La Porta, T. F., C. Petrioli, D. Spenza. June 2011. Sensor-mission Assignment in Wireless Sensor Networks with Energy Harvesting. *Proceedings of the Eighth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2011)*. pp. 413-421. Salt Lake City, UT.
 240. Kumar*, R., S. Eswaran*, T. F. La Porta. June 2011. End-to-End Rate Selection for Opportunistic Reception in Multi-Rate Wireless Network. *Proceedings of the Eighth Annual IEEE Communications Society Conference on Sensor, Mesh and Ad Hoc Communications and Networks (SECON 2011)*. pp. 601-609. Salt Lake City, UT. (First two author supervised by candidate)
 241. Pizzocaro, D., A. Preece, F. Chen*, T. F. La Porta, A. Bar-Noy. June 2011. A Distributed Architecture for Heterogeneous Multi-Sensor Task Allocation. *Proceedings of the Seventh IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2011)*. 8 pages. Barcelona, Spain. (Third author supervised by candidate)
 242. Kumar* R., G. Maselli, C. Petrioli, T. F. La Porta. October 31-November 4, 2011. Interference Cancellation-based RFID Tag Identification. *Proceedings of the Fourteenth ACM International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (MSWiM 2011)*. pp. 111-118. Miami Beach, FL. (First author supervised by candidate)
 243. Zhuo, X., Q. Li, G. Cao, Y. Dai, B. Szymanski, T. F. La Porta. October 2011. Social-Based Cooperative Caching in DTNs: A Contact Duration Aware Approach. *Proceedings of the Eighth IEEE International Conference on Mobile and Ad Hoc Sensor Systems (MASS 2011)*. pp. 92-101. Valencia, Spain. (Li presented)
 244. Tati*, S., S. Rager*, B. J. Ko, G. Cao, A. Swami, T. F. La Porta. October 2011. netCSI: A Generic Fault Diagnosis Algorithm for Large Scale Failures in Computer Networks. *Proceedings of the Thirtieth International Symposium on Reliable and Distributed Systems (SRDS 2011)*. Madrid, Spain. (First two authors supervised by candidate)
 245. Rager*, S., E. Ciftcoglu, A. Yener, T. F. La Porta, M. J. Neely. November 2011. Distributed Backpressure Protocols with Limited State Feedback. *Proceedings of the IEEE Military Communications Conference (MILCOM 2011)*. pp. 693-698. Baltimore, MD. (First author supervised by candidate)
 246. Zhang, Y., S. Ray*, G. Cao, T. F. La Porta. November 2011. Data Replication in Mobile Tactical Networks. *Proceedings of the IEEE Military Communications Conference (MILCOM 2011)*. pp. 797-803. Baltimore, MD. (Second author supervised by candidate)

247. Zheng, Q., G. Cao, A. Swami, T. F. La Porta. November 2011. Detecting and Localizing Large-Scale Router Failures Using Active Probes. *Proceedings of the IEEE Military Communications Conference (MILCOM 2011)*. pp. 1170-1175. Baltimore, MD.
248. Chen*, F., K. Guo, J. Lin, T. F. La Porta. March 2012. Intra-cloud Lightning: Building CDNs in the Cloud. *Proceedings of the Thirty-First Annual International Conference on Computer Communications (INFOCOM 2012)*. pp. 433-441. Orlando, FL. (First author supervised by candidate)
249. Bahjat*, A. Y. Jiang, T. Cook, T. F. La Porta. March 2012. Quality of Information Functions for Networked Applications. *Proceedings of the Tenth Annual IEEE International Conference on Pervasive Computing and Communications (PerCom 2012) Workshops*. pp. 2-7. Lugano, Switzerland. (First author supervised by candidate)
250. Chen*, F., T. F. La Porta, D. Pizzocaro, A. Preece, M. Srivastava. April 2012. A System Architecture for Exploiting Mission Information Requirement and Resource Allocation. *Proceedings of the SPIE Defense, Security, and Sensing 2012*. 9 pages. Baltimore, MD. (First author supervised by candidate)
251. Tang, L., Q. Gu, X. Yu, J. Han, T. F. La Porta, A. Leung, T. Abdelzaher, L. Kaplan. April 2012. IntruMine: Mining Intruders in Untrustworthy Data of Cyber-Physical Systems. *Proceedings of the Twelfth SIAM International Conference on Data Mining (SDM 2012)*. pp. 600-611. Anaheim, CA.
252. Alayev, Y., F. Chen*, Y. Hou, M. Johnson*, A. Bar-Noy, T. F. La Porta, K. Leung. May 2012. Throughput Maximization in Mobile WSN Scheduling with Power Control and Rate Selection. *Proceedings of the Eighth IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2012)*. pp. 33-40. Hangzhou, China. (Second author supervised by candidate)
253. Chen*, F., T. F. La Porta, M. Srivastava. May 2012. Resource Allocation with Stochastic Demands. *Proceedings of the Eighth IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2012)*. pp. 257-264. Hangzhou, China. (First author supervised by candidate)
254. Zheng, Q., G. Cao, T. F. La Porta, A. Swami. June 2012. Optimal Recovery from Large-Scale Failures in IP Networks. *Proceedings of the Twenty-Third IEEE International Conference on Distributed Computing Systems (ICDCS 2012)*. pp. 295-304. Macau, China.
255. Chen*, F., M. Johnson*, A. Bar-Noy, T. F. La Porta. June 2012. Convergecast with Aggregatable Data Classes. *Proceedings of the Ninth Annual IEEE Communications Society Conference on Sensor, Mesh, and Ad Hoc Communications and Networks (SECON 2012)*. pp. 148-156. Seoul, South Korea.
256. Tati*, S., B.-J. Ko, G. Cao, A. Swami, T. F. La Porta. June 2012. Adaptive Algorithms for Diagnosing Large-Scale Failures in Computer Networks. *Proceedings of the IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2012)*. 12 pages. Boston, MA. (First author supervised by candidate)
257. Ra, M.-R., B. Liu, T. F. La Porta, R. Govindan. June 2012. Medusa: A Programming Framework for Crowd-Sensing Applications. *Proceedings of the Tenth International Conference on Mobile Systems, Applications, and Services (MobiSys 2012)*. pp. 337-350. Ambleside, UK.

258. Lin*, M., T. F. La Porta. July 30-August 2, 2012. Dynamic Interference Management with Femtocells. *Proceedings of the Twenty-First IEEE International Conference on Computer Communication Networks (ICCCN 2012)*. 9 pages. Munich, Germany. (First author supervised by candidate)
259. De Coppi, N., J. Ning, G. Papageorgiou, M. Zorzi, S. Krishnamurthy, T. F. La Porta. July 30-August 2, 2012. Network Coding-Aware Queue Management in Multi-Rate Wireless Networks. *Proceedings of the Twenty-First IEEE International Conference on Computer Communication Networks (ICCCN 2012)*. 7 pages. Munich, Germany.
260. Kim*, E. Y., P. McDaniel, T. F. La Porta. September 2012. A Detection Mechanism for SMS Flooding Attacks in Cellular Networks. *Proceedings of the Eighth International Conference on Security and Privacy in Communication Networks (SECURECOMM 2012)*. 18 pages. Padua, Italy. (First author supervised by candidate)
261. Ramanathan, R. A. Samanta, T. F. La Porta. October 2012. Symptotics: A Framework for Analyzing the Scalability of Real-World Wireless Networks. *Proceedings of the Ninth ACM Symposium on Performance Evaluation of Wireless Ad Hoc, Sensor, and Ubiquitous Networks (PE-WASUN 2012)*. pp. 31-38. Paphos, Cyprus.
262. Papageorgiou, G., S. Singh, S. V. Krishnamurthy, R. Govindan, T. F. La Porta. October 30-November 2, 2012. Distortion-Resilient Routing for Video Flows in Wireless Multi-hop Networks. *Proceedings of the Twentieth IEEE International Conference on Network Protocols (ICNP 2012)*. 10 pages. Austin, TX.
263. Atya, A.F., I. Broustis, S. Singh, D. Syrivelis, S.V. Krishnamurthy, T. F. La Porta. April 2013. Wireless Network Coding: Deciding When to Flip the Switch. *Proceedings of the IEEE INFOCOM Mini-Conference*. pp. 260-264. Turin, Italy.
264. Feng, Z., G. Papageorgiou, S.V. Krishnamurthy, R. Govindan, T. F. La Porta. April 2013. Trading Off Distortion for Delay for Video Transmissions in Wireless Networks. *Proceedings of the IEEE INFOCOM Mini-Conference*. pp. 1878-1886. Turin, Italy.
265. Bartolini, N., G. Bongiovanni, T. F. La Porta, S. Silvestri*. April 2013. On the Security Vulnerabilities of the Virtual Force Approach to Mobile Sensor Deployment. *Proceedings of the Thirty-Second IEEE International Conference on Computer Communications (INFOCOM 2013)*. pp. 2418-2426. Turin, Italy.
266. Tang, L., X. Yu, S. Kim, Q. Gu, J. Han, A. Leung, T. F. La Porta. August 2013. Mining Lines in the Sand: On Trajectory Discovery from Untrustworthy Data in Cyber-Physical System. *Proceedings of the Nineteenth ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD 2013)*. pp. 410-418. Chicago, IL.
267. Yang, Y., N. Chawla, P. Basu, B. Prabhala*, T. F. La Porta. August 2013. Link Prediction in Human Mobility Networks. *Proceedings of the Advances in Social Networks Analysis and Mining (ASONAM 2013)*. pp. 380-387. Niagara, ON, Canada.
268. Lin*, M., T. F. La Porta. September 2013. Utility-based Femto-cell Pilot Management. *Proceedings of the Twenty-Fourth Annual IEEE International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC 2013)*. London, UK.

269. Papageorgiou, G., J. Gasparis, S. V. Krishnamurthy, R. Govindan, T. F. La Porta. December 2013. Resource Thrifty Secure Mobile Video Transfer on Open WiFi Networks. *Proceedings of the Ninth ACM International Conference on Emerging Network Experiments and Technologies (CoNext 2013)*. 12 pages. Santa Barbara, CA.
270. Holbert*, B., S. Tati*, S. Silvestri*, A. Swami, T. F. La Porta. November 2013. Effects of Partial Topology on Fault Diagnosis. *Proceedings of the Military Communications Conference (MILCOM 2013)*. pp. 725-730. San Diego, CA.
271. Ciftioglu*, E., R. Ramanathan, T. F. La Porta. November 2013. Scalability Analysis of Tactical Mobility Patterns. *Proceedings of the Military Communications Conference (MILCOM 2013)*. pp. 1888-1893. San Diego, CA.
272. Hu*, N., D. Pizzocaro, M. P. Johnson, T. F. La Porta, A. Preece. October 2013. Resource Allocation with Non-Deterministic Demands and Profits. *Proceedings of the Tenth IEEE International Conference on Mobile Ad-hoc and Sensor Systems (MASS 2013)*. pp. 145-153. Hangzhou, China.
273. Ciftioglu, E. N., A. Michaloliakos, K. Psounis, T. F. La Porta, A. Yener. April 2014. Power Minimization with Quality-of-information Outages. *Proceedings of the IEEE Wireless Communications and Networking Conference (WCNC 2014)*. pp. 1655-1660. Istanbul, Turkey.
274. Lin*, M., T. F. La Porta. April 2014. Energy-aware Enterprise Femtocell Deployment. *Proceedings of the IEEE Wireless Communications and Networking Conference (WCNC 2014)*. pp. 2312-2317. Istanbul, Turkey.
275. Prabhala*, B., J. Wang, B. Deb, T. F. La Porta, J. Han. April 2014. Leveraging Periodicity in Human Mobility for Next Place Prediction. *Proceedings of the IEEE Wireless Communications and Networking Conference (WCNC 2014)*. pp. 2665-2670. Istanbul, Turkey.
276. Rager*, S., E. Ciftioglu, T. F. La Porta, A. Leung, W. Dron, R. Ramanathan, J. Hancock. May 2014. Data Selection for Maximum Coverage in Sensor Networks with Cost Constraints. *Proceedings of the IEEE International Conference on Distributed Computing in Sensor Systems (DCOSS 2014)*. pp. 209-216. Marina Del Ray, CA.
277. Bartolini, N., G. Bongiovanni, T. F. La Porta, S. Silvestri*, F. Vincenti. June 2014. Voronoi-based Deployment of Mobile Sensors in the Face of Adversaries. *Proceedings of the IEEE International Conference on Communications (ICC 2014)*. pp. 532-537. Sydney, Australia.
278. Tati*, S., S. Silvestri*, T. He, T. F. La Porta. June 30-July 3, 2014. Robust Network Tomography in the Presence of Failures. *Proceedings of the Thirty-Fourth IEEE International Conference on Distributed Computing Systems (ICDCS 2014)*. Pp. 481-492. Madrid, Spain.
279. Rager*, S. T., E. N. Ciftioglu, T. F. La Porta. August 2014. Performance Analysis of Practical Distributed Backpressure Protocols. *Proceedings of the Twenty-Third International Conference on Computer Communication and Networks (ICCCN 2014)*. pp. 1-8. Shanghai, China.
280. McDaniel, P., T. Jaeger, T. F. La Porta, N. Papernot, R. J. Walls, A. Kott, L. M. Marvel, A. Swami, P. Mohapatra, S. V. Krishnamurthy, I. Neamtiu. November 2014. Security and Science of Agility. *Proceedings of the First ACM Workshop on Moving Target Defense (MTD 2014)*. pp. 13-19. Scottsdale, AZ. **(Keynote Address)**

281. Dao, T., A. K. Roy-Chowdhury, H. V. Madhyastha, S. V. Krishnamurthy, T. F. La Porta. December 2014. Managing Redundant Content in Bandwidth Constrained Wireless Networks. *Proceedings of the Tenth ACM International on Conference on Emerging Networking Experiments and Technologies (CoNEXT 2014)*. pp. 349-362. Sydney, Australia.
282. Silvestri*, S., B. Holbert*, P. Novotny, T. F. La Porta, A. Wolf, A. Swami. January, 2015. Inferring Network Topologies in MANETs Applied to Service Redeployment. *Proceedings of 17th International Conference on Computer Communications and Networks (ICCN)*, Zurich, Switzerland.
283. Holbert*, B., S. Tati*, S. Silvestri*, T. F. La Porta, A. Swami. February 2015. Network Topology Inference with Partial Path Information. *Proceedings of the International Conference on Computing, Networking and Communications (ICNC 2015)*. pp. 796-802. Garden Grove, CA.
284. Mukherjee*, M., J. Edwards*, H. Kwon, T. F. La Porta. March 2015. Quality of Information-aware Real-time Traffic Flow Analysis and Reporting. *Proceedings of the 2015 IEEE International Conference on Pervasive Computing and Communication Workshops, PerCom Workshops*. pp. 69-74. St. Louis, MO.
285. Prabhala*, B., T. F. La Porta. April 26-May 1, 2015. Next Place Predictions Based on User Mobility Traces. *Proceedings of the 2015 IEEE Conference on Computer Communications Workshops, INFOCOM Workshops*. pp. 93-94. Hong Kong, China.
286. Hu*, N., T. F. La Porta, N. Bartolini. October, 2015. Self-Adaptive Resource Allocation for Event Monitoring with Uncertainty in Sensor Networks. *Proceedings of the 12th IEEE International Conference on Mobile Ad hoc and Sensor Systems (IEEE MASS 2015)*. Dallas, TX.
287. M. Lin*, S. Silvestri*, N. Bartolini, T.F. La Porta. October, 2015. Energy-Efficient Selective Activation in Femtocell Networks. *Proceedings of the 12th IEEE International Conference on Mobile Ad hoc and Sensor Systems (IEEE MASS 2015)*. Dallas, TX.
288. J. Edwards, T. Cassidy, G. de Mel, T. F. La Porta, "Integrating Quality of Information with Pragmatic Assistance," Proc. of IEEE 13th International Workshop on Managing Communications and Services, 2016.
289. S. Rager, E. Ciftioglu, R. Ramanathan, T.F. La Porta, R. Govindan, "Scalability and Satisfiability of Quality of Information in Wireless Networks," Proc. of IEEE WCNC, 2016.
290. Z. Lu, G. Cao, T.F. La Porta, "Networking Smartphones for Disaster Recovery," Proc. of IEEE PERCOM, 2016.
291. T. He, N. Bartolini, H. Khamfroush, I. Kim, L. Ma, T.F. La Porta, "Service Placement for Detecting and Localizing Failures Using End-to-End Observations", Proc. of IEEE ICDCS, 2016.
292. N. Bartolini, S. Ciavarella, T. F. La Porta, S. Silvestri, "Network Recovery After Massive Failures," IEEE/IFIP International Conference on Dependable Systems and Networks (DSN 2016).
293. "S. Achleitner, T.F. La Porta, S. Krishnamurthy, V.S. Quizhpi, "Network Coding Efficiency in the Presence of an Intermittent Backhaul Network," Proc. of IEEE ICC 2016.
294. M. Lin, N. Bartolini, T. F. La Porta, "Power Adjustment and Scheduling in OFDMA Femtocell Networks," Proc. of IEEE INFOCOM, 2016.

295. Z. Lu, X. Sun, T. F. La Porta, "Cooperative Data Offloading in Opportunistic Mobile Networks," Proc. of IEEE INFOCOM, 2016.
296. N. Felemban, Z. Lu, T.F. La Porta, K. Chan, K, "Video processing of complex activity detection in resource-constrained networks," 2016 IEEE Global Conference on Signal and Information Processing (GlobalSIP). IEEE, 2016.
297. S. Achleitner, S. Sugrim, P. McDaniel, S. Krishnamurthy, R. Chadha, T.F. La Porta, "Cyber Deception: Virtual Networks to Defend Insider Reconnaissance," Proc. Of ACM Workshop on Managing Insider Security Threats (MIST) 2016.
298. Z. Lu, K. Chan, R. Uргаonkar, T.F. La Porta, "On-demand Video Processing in Wireless Networks," Proc. Of IEEE ICNP, 2016.
299. Z. B. Celik, N. Hu, Y. Li, N. Papernot, P. Mc Daniel, R. Walls, J. Rowe, K. Levitt, N. Bartolini, T.F. La Porta, R. Chadha, "Mapping Sample Scenarios to Operational Models," Proc. Of IEEE MILCOM, 2016.
300. J. Edwards, R. Passonneau, T. Cassidy, T.F. La Porta, "Resource Allocations for Pragmatically-assisted Quality of Information-Aware Networking," Proc. of IEEE ICCCN, 2017.
301. D. Tootaghaj, H. Khamfroush, N. Bartolini, S. Ciaverelli, S. Hayes, T.F. La Porta, Network Recovery from Massive Failures and Uncertain Knowledge of Failures," IFIP Networking, 2017.
302. S. Achleitner, T.F. La Porta, P. McDaniel, S. Krishnamurthy, A. Poylisher, C. Serban, "Stealth Migration: Hiding Virtual Machines on the Network," Proc. of IEEE INFOCOM, 2017.
303. S. Ciavarella, N. Bartolini, H. Khamfroush, T.F. La Porta, "Progressive Damage Assessment and Network Recovery After Massive Failures," Proc. of IEEE INFOCOM, 2017.
304. A. Atya, Z. Qian, S. Krishnamurthy, T.F. La Porta, P. McDaniel, L. Marvel, "Malicious Co-Residency on the Cloud: Attacks and Defense," Proc. of IEEE INFOCOM 2017.
305. S. Achleitner, T.F. La Porta, T. Jaeger, P. McDaniel, "Adversarial Network Forensics in Software Defined Networking, Proc of ACM Symposium on SDN Research, 2017. **Best student paper.**
306. D. Tootaghaj, H. Khamfroush, N. Bartolini, S. Ciaverelli, S. Hayes, T.F. La Porta, "Network Recovery from Massive Failures and Uncertain Knowledge of Failures," IFIP Networking, 2017.
307. J. Edwards, R. Passonneau, T. Cassidy, T.F. La Porta, "Resource Allocations for Pragmatically-assisted Quality of Information-Aware Networking," Proc. of IEEE ICCCN, 2017.
308. D. Z. Tootaghaj, N. Bartolini, H. Khamfroush, T.F. La Porta, "Controlling Cascading Failures in Interdependent Networks under Incomplete Knowledge," Proc. of 36th Symposium on Reliable Distributed Systems, 2017.
309. J. Acquaviva, M. Mahon, B. Einfalt, and T.F. La Porta, "Optimal Cyber-Defense Strategies for Advanced Persistent Threats: A Game Theoretical Analysis," Proc. of 36th Symposium on Reliable Distributed Systems, 2017.
310. A. Atya, A. Aqil, K. Khalil, Z. Qian, S. V. Krishnamurthy, T. F. La Porta, "Stalling Live Migrations on the Cloud," Proc. of 11th USENIX Workshop on Offensive Technologies (WOOT), 2017.

311. Z. Lu, S. Rallapalli, K. Chan, T.F. La Porta, "Modeling Resource Requirements of Convolutional Neural Networks on Mobile Devices," Proc. of ACM Multimedia, 2017.
312. D. Z. Tootaghaj, T. He, T.F. La Porta, "Parsimonious Tomography: Optimizing Cost-Identifiability Trade-off for Probing-based Network Monitoring," IFIP Performance, 2017.
313. Z. Lu, K. Chan, T.F. La Porta, "A Computing Platform for Video Crowdprocessing Using Deep Learning," Proc. Of IEEE INFOCOM, 2018.
314. Y. Cao, A. Atya, S. Singh, Z. Qian, S. Krishnamurthy, T. La Porta, P. Krishnamurthy and L. Marvel "A Framework for MIMO-based Packet Header Obsfucation," Proc. of IEEE INFOCOM, 2018.
315. T. He, H. Khamfroush, S. Wang, S. Stein, T.F. La Porta, "It's Hard to Share: Joint Service Placement and Request Scheduling in Edge Clouds with Sharable and Non-sharable Resources," Proc. of IEEE ICDCS, 2018.
316. S. Saghaian, T.F. La Porta, T. Jaeger, B. Celik, P.McDaniel, "Mission-oriented Security Model, Incorporating Security Risk, Cost and Payout," International Conference on Security and Privacy in Communication Networks (SECURECOMM), 2018 (**best paper**).
317. G. Bent, G. de Mel, R Ganti, T. F. La Porta, G. Pearson, T. Pham, S. Stein., A. Swami, L. Tassiulas, I. Taylor, "Learning Service Semantics for Self-organization in Distributed Environments: Concepts and Research Directions, Proc. of IEEE MILCOM, 2018.
318. V. Walls, H. Kwon, T.F. La Porta, S. Stein, L. Tassiulas, "On the Design of Resource Allocation Algorithms for Low-Latency Video Analytics," Proc. of IEEE MILCOM, 2018.
319. H. Alhulayyil, K. Khalil, S. Krishnamurthy, D. Cansever, T. F. La Porta, A. Swami, "On the Detection of Adaptive Side-channel Attackers in Cloud Environments," Proc. of IEEE Globecom CISS, 2018.
320. M. Ochal, S. Stein, F. Bi, M. Cook, E. Gerding, T. He and T. La Porta, "Online Mechanism Design using Reinforcement Learning for Cloud Resource Allocation," Proc of 2nd Workshop on Advances in Augmentation in Artificial Intelligence," 2018.
321. N. Desai, W. Chong, H. Achilles, S. Daijavad, T.F. La Porta, "Large-Scale Hybrid Ad Hoc Network for Mobile Platforms: Challenges and Experiences," Proc. of IEEE SMARTCOMP, 2019.
322. F. Mehmeti, and T. F. La Porta, "Optimizing 5G Performance by Reallocating Unused Resources," in Proc. of IEEE ICCCN 2019, Valencia, Spain.
323. F. Mehmeti, T.F. La Porta, "Admission Control for Consistent Users in Next Generation Cellular Networks," Proc. of IEEE International Conference on Communications (ICC), 2019.
324. V. Farhadi, F. Mehmeti, T.F. La Porta, T. He, H. Khamfroush, S. Wang, K.S. Chan, "Service Placement and Request Scheduling for Data-intensive Applications in Edge Clouds," Proc. of IEEE INFOCOM, 2019.
325. S. Gharebaghi, S. G. Vennelaganti, N. R. Chaudhuri*, T. He, T. La Porta, "Solving the Divergence Problem in AC-QSS Cascading Failure Model by Introducing the

- Effect of a Realistic UVLS Scheme,” 2020 IEEE PES Innovative Smart Grid Technologies Europe (ISGT-Europe), 2020.
326. K. Wheatman, F. Mehmeti, M. Mahon, H. Qui, K. Chan, T.F. La Porta, “Optimal Resource Allocation for Crowdsourced Image Processing,” Proc. of IEEE SECON, 2020.
 327. S. Stein, M. Ochal, I.-A. Moisoiu, E. Gerding, R. Ganti, T. He, T.F. La Porta, “Strategyproof Reinforcement Learning for Online Resource Allocation,” Proc. of Adaptive Agents and Multi-Agents Systems (AAMAS), 2020.
 328. P. Basu, T. Salonidis, B. Kraczek, S. Saghaian, A. Sydney, B.-J. Ko, T.F. La Porta, K. S. Chan, “Decentralized placement of data and analytics in wireless networks for energy-efficient execution,” Proc. of IEEE INFOCOM, 2020.
 329. Q. Burke, P. McDaniel, T. La Porta, M. Yu, T. He, “Misreporting Attacks in Software-Defined Networking,” Proc of 16th EAI International Conference on Security and Privacy in Communication Networks (SecureComm 2020).
 330. S. M. Saghaian, T.F. La Porta, S. Silvestri, P. McDaniel, “Improving Robustness of a Popular Probabilistic Clustering Algorithm Against Insider Attacks,” Proc of 16th EAI International Conference on Security and Privacy in Communication Networks (SecureComm 2020).
 331. I. Barclay, C. Simpkin, G. Bent, T. La Porta, D. Miller, A. Preece, I. Taylor, D. Verma, “Enabling Discoverable Trusted Services for Highly Dynamic Decentralized Workflows,” Proc of 15th Workshop on Workflows in Support of Large-Scale Science (WORKS20), held in conjunction with SC20, 2020.
 332. K. Wheatman, F. Mehmeti, M. Mahon, T.F. La Porta, G. Cao, “(Multi-User Competitive Energy-Aware and QoE-Aware Video Streaming on Mobile Devices,” Proc. of Q2SWINet’20 held in conjunction with ACM MSWiM, 2020.
 333. Y. Huang, T. He, N. Chaudhuri, T.F. La Porta, “Power Grid State Estimation under General Cyber-Physical Attacks,” Proc. of 2020 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm) - Cyber Security and Privacy Symposium, 2020.
 334. S. Shringarputale, P. McDaniel, K. Butler, T. La Porta, “Co-residency Attacks on Containers are Real,” The ACM Cloud Computing Security Workshop, 2020.
 335. C. Rublein, F. Mehmeti, M. Towers, S. Stein, T.F. La Porta, “Online Resource Allocation in Edge Computing Using Distributed Bidding Approaches,” Proc. of IEEE MASS 2021.
 336. N. Felemban, F. Mehmeti, H. Kwon, T.F. La Porta, “EDIR: Efficient Distributed Image Retrieval of Novel Objects in Mobile Networks,” Proc. of IEEE MASS 2021.
 337. Z. Wang, S. Zhu, K. Man, P. Zhu, Y. Hao, Z. Qian, S. Krishnamurthy, T. La Porta, M. De Lucia, “Ambiguity-Aware Network Intrusion Detection based on Symbolic Model Comparison,” Proc. of ACM CCS 2021..
 338. V. Farhadi, S. G. Vennelaganti, T. He, N. Ray Chaudhuri and T. La Porta, “Budget-Constrained Reinforcement of SCADA for Cascade Mitigation,” Proc of IEEE International Conference on Computer Communications and Networks (ICCCN 2021).
 339. S. Gharebaghi, G. Vennelaganti, N. Ray Chaudhuri, T. He, T.F. La Porta, “A More Realistic AC-QSS Cascading Failure Model with Decentralized UVLS and

- Centralized RAS,” Proc of IEEE Power and Energy Society General Meeting, Washington, D.C., July, 2021.
340. F. Mehmeti, T.F. La Porta, “Modeling and Analysis of mMTC Traffic in 5G Base Stations,” Proc. of IEEE Consumer Communications & Networking Conference (CCNC), 2021.
 341. N. Felemban, F. Mehmeti, T.F. La Porta, “VidQ: Video Query Using Optimized Audio-Visual Processing,” International Symposium on QoS and Security for Wireless and Mobile Networks (Q2SWinet ’21), in conjunction with ACM MSWIM, 2021.
 342. F. Mehmeti, T.F. La Porta, “Admission Control for mMTC Traffic in 5G Networks,” International Symposium on QoS and Security for Wireless and Mobile Networks (Q2SWinet ’21), in conjunction with ACM MSWIM, 2021.
 343. F. Mehmeti, T.F. La Porta, “Resource Allocation for Improved User Experience with Live Video Streaming in 5G,” International Symposium on QoS and Security for Wireless and Mobile Networks (Q2SWinet ’21), in conjunction with ACM MSWIM, 2021.
 344. F. Mehmeti, T.F. La Porta, “Efficient Resource Allocation with Constrained Rate Variability in Cellular Networks,” International Symposium on QoS and Security for Wireless and Mobile Networks (Q2SWinet ’21), in conjunction with ACM MSWIM, 2021.
 345. F. Mehmeti, T.F. La Porta, “Admission Control for URLLC Users in 5G Networks,” 24th International Conference on Modeling, Analysis and Simulation of Wireless and Mobile Systems (ACM MSWIM), 2021.
 346. F. Mehmeti, T.F. La Porta, “Minimizing Rate Variability with Effective Resource Utilization in 5G Networks,” Proc. of 19th ACM International Symposium on Mobility Management and Wireless Access (MobiWac), 2021. **Best Paper**
 347. Y. Huang, T. He, N. Chaudhuri, T.F. La Porta, “Preventing Outages under Coordinated Cyber-Physical Attack with Secured PMUs,” Proc. of 2021 IEEE International Conference on Communications, Control, and Computing Technologies for Smart Grids (SmartGridComm) - Cyber Security and Privacy Symposium, 2021.
 348. F. Mehmeti, T.F. La Porta, “Modeling and Analysis of mMTC Traffic in 5G Base Stations,” Proc. of IEEE Consumer Communications & Networking Conference (CCNC), 2022.
 349. V. Farhadi, T. F. La Porta, T. He, N. Ray Chaudhuri, “Resource allocation in 5G multi-tenancy network slicing for balancing distribution power systems,” Proc. of IEEE MASS 2022.
 350. C. Rublein, F. Mehmeti, T.D. Gunes, S. Stein, T.F. La Porta, “Scalable Resource Allocation Techniques for Edge Computing Systems,” Proc. of IEEE ICCCN 2022.
 351. M. Yu, Q. Burke, T. F. La Porta, P. McDaniel, “mMLSnet: Multilevel Security Network With Mobility,” Proc. of IEEE MILCOM, 2023.
 352. V. Farhadi, T. F. La Porta, T. He, “5G multi-numerology applications in power distribution systems,” Proc. of IEEE MASS 2023.
 353. C. Guan, H. Liu, G. Cao, S. Zhu and T. La Porta, “HoneyIoT: Adaptive High-Interaction Honeypot for IoT Devices Through Reinforcement Learning,” ACM WiSec, 2023.

354. K. Wheatman, F. Mehmeti, M. Mahon, T.F. La Porta, "QoE-Analysis of 5G Network Resource Allocation Schemes for Competitive Multi-User Video Streaming Applications," IEEE Vehicular Technology – Spring, 2023.
355. S. Gharebaghi, G. Vennelaganti, N. Ray Chaudhuri, T. He, T.F. La Porta, "A Method for Parallelized Fast Dynamic Cascading Failure Simulation of Power System," IEEE PES General Meeting, 16-20 July 2023 Orlando, FL.
356. C. Guan, X. Chen, G. Cao, S. Zhu, T. La Porta, "HoneyCam: Scalable High-Interaction Honeypot for IoT Cameras Based on 360-Degree Video," IEEE Conference on Communications and Network Security (CNS), 2023.
357. M. Chen, T.F. La Porta, T. Taylor, F. Araujo, T. Jaeger, "Manipulating OpenFlow Link Discovery Packet Forwarding for Topology Poisoning," Proc of ACM Conference on Computer and Communications Security, 2024.
358. R. George, M. Chen, K. Huang, Z. Qian, T. F. La Porta, T. Jaeger, "OPTISAN: Using Multiple Spatial Error Defenses to Optimize Stack Memory Protection within a Budget," USENIX Security, Fall 2024.
359. C. Rublein, F. Mehmeti, M. Mahon, T.F. La Porta, "Impact of Client Choice on Distributed Resource Allocation in Edge Computing," IEEE ICCCN, 2024.
360. M. Chen, T.F. La Porta, T. Jaeger, S. Krishnamurthy, "Lightweight Coordinated Sampling for Dynamic Flows under Budget Constraints," IEEE ICCCN, 2024.
361. Y. Jiang, V. Farhadi, Y. Li, N. Chaudhuri, T. F. La Porta, "Privcy-Aware Short-Term Electrical Load Forecasting Using Reinforcement Learning Optimized Transformer," Proceedings of the ASME 2025 International Mechanical Engineering Congress and Exposition, Nov, 2025.

Patents (with various co-inventors)

362. **5,434,852 (7/18/95):** Distributed Processing Architecture for Control of Broadband and Narrowband Communication Networks
363. **5,473,679 (12/5/95):** A Signaling System for Broadband Communications Networks
364. **5,509,010 (4/16/96):** Communications Signaling Protocols
365. **5,563,939 (10/8/96):** Method and System for Delivering a Communication Service
366. **5,570,367 (10/29/96):** Asymmetric Protocol for Wireless Communications
367. **5,600,663 (2/4/97):** Adaptive Forward Error Correction System
368. **5,659,544 (8/19/97):** Method and System for Distributed Control in Wireless Cellular and Personal Communications Networks
369. **5,918,158 (6/28/99):** Two-Way Wireless Messaging System
370. **5,943,408 (8/24/99):** Flexible Direct Signaling System
371. **5,943,334 (8/24/99):** Method of Using an Intelligent Mobile Terminal for Reconnecting Calls in a Wireless Network
372. **5,953,331 (9/14/99):** Wireless Packet System for Efficient Wide Area Bandwidth Utilization
373. **5,959,543 (9/28/99):** Two-Way Wireless Messaging System with Flexible Messages
374. **5,970,122 (10/19/99):** Two-Way Wireless Messaging System Having a User Agent
375. **5,974,300 (10/26/99):** Two-Way Wireless Cellular Messaging System
376. **6,014,429 (1/11/00):** Two-Way Wireless Cellular Messaging System with Transaction Server

- 377. **6,016,319 (1/18/00)**: Communication System for Transmission of Datagram Packets Over Connection-Oriented Networks
- 378. **6,041,103 (3/21/00)**: Interactive Call Identification
- 379. **6,081,715 (6/27/00)**: Method and System for Distributed Control in Wireless and Cellular Personal Communication Systems
- 380. **6,085,086 (7/4/00)**: Network-Based Migrating User Agents for Personal Communication Services
- 381. **6,192,250 (2/20/01)**: A Cluster Mobile Switching Center
- 382. **6,215,782 (4/1/01)**: Method for Reconnecting Calls in a Wireless Telecommunications System
- 383. **6,298,039 (10/2/01)**: High Availability Distributed Call Processing Method and Apparatus
- 384. **6,434,134 (8/13/02)**: Method and System for Distributed Control in Wireless and Cellular Personal Communications Systems
- 385. **6,483,853 (11/19/02)**: Communications system for transmission of datagram packets over connection-oriented Networks
- 386. **6,496,505 (12/17/02)**: Packet Tunneling Optimization To Wireless Devices Accessing Packet-Based Wired Network
- 387. **6,516,000 (2/4/03)**: Communications System For Transmission Of Datagram Packets Over Connection-Oriented Networks
- 388. **6,654,359 (11/25/03)**: Wireless Access To Packet-Based Networks
- 389. **6,763,007 (7/13/04)**: Two Phase Local Mobility Scheme For Wireless Access To Packet Based Networks
- 390. **6,842,462 (1/11/05)**: Wireless Access Of Packet Based Networks
- 391. **7,085,260 (8/1/06)**: Internet protocol based wireless call processing
- 392. **7,120,453 (10/10/06)**: Paging of mobile hosts on an internet protocol network
- 393. **7,239,618 (7/3/07)**: Single phase local mobility scheme for wireless access to packet-based networks (Filed while at Bell Labs with several other inventors)
- 394. **7,340,253 (3/4/08)**: IP-based Distributed Wireless Access Network Architecture for CDMA Networks
- 395. **7,522,632 (4/21/09)**: Multiple-protocol home location register and method of use (with several co-inventors)
- 396. **7,554,967 (6/30/09)**: Transient tunneling for dynamic home addressing on mobile hosts (with several co-inventors)
- 397. **7,729,252 (6/1/2010)**: Methods and devices for providing fast and robust overload control
- 398. **7,822,416 (10/26/2010)**: Methods and systems for allowing global roaming between devices supported by different protocols