

# Communications Futures

## CFP Report FALL 2013

### CFP All-Members' Meetings

The CFP all-members' meetings are an opportunity for participants to gather in person for a couple of days at MIT or alternately, a member site. These meetings are an occasion for our members to meet each other face to face and share ideas. We also bring in outside speakers, including both academics and industry leaders. The plenary meetings are an excellent networking opportunity. All conference materials are available to our members on our Web site.

- [October 24, 2013](#), Cambridge, MA
- [April 24, 2013](#), Cambridge, MA
- [November 15-16, 2012](#) Cambridge, MA
- [April 23, 2012](#), Cambridge, MA
- [October 24-25, 2011](#), Huawei, Santa Clara, CA
- [May 4-5, 2011](#), MIT Cambridge, MA
- [October 20-21, 2010](#), Nokia Siemens Networks, Munich, Germany
- [April 14-15, 2010](#), MIT, Cambridge, MA
- [October 28-29, 2009](#) - MIT Cambridge, MA
- [May 13-14, 2009](#) - Telecom Italia, Venice, Italy
- [October 23-24, 2008](#) - MIT, Cambridge, MA
- [January 22 - 23, 2008](#) – Cisco, San Jose, CA
- [May, 30 - 31, 2007](#) – Comcast, Philadelphia, PA
- [October 31, 2007](#) – Research Agenda Planning Meeting, Cambridge, MA
- June 20 - 22, 2006 – Cambridge, UK
- [January 18 - 19, 2006](#) – Nortel, Richardson, TX
- [June 29 - July 1, 2005](#) – BT, Cambridge, UK
- [January 25 - 27, 2005](#) – MIT, Cambridge, MA

### Working Groups

The CFP operates primarily on the basis of working groups. This structure allows industry participants to engage closely with faculty and help guide the direction of the program. Working groups provide a forum for presenting research work and generating collective insights, with the goal of producing white papers and presentations. All work in progress is available exclusively to members on our wiki. Outputs are publicly available, and are occasionally published outside CFP, by agreement of the authors and our sponsors. Members are not obligated to contribute specific deliverables, however, while the working group leaders provide an agenda and structure to the discussions, the success of the program as a whole, and the value derived by our members depends on their participation—the more they contribute, the more value they get.

Working groups are launched as new issues emerge and disbanded as issues are resolved or become less relevant. They are co-chaired by faculty and industry sponsors. The scope of activities is determined by the interests of the participants. Each working group has its own mode of operation with most meeting regularly (monthly or every 2 weeks) throughout the year via WebEx (accessible to anyone on the Internet or by phone), so travel is not necessary. Working groups may change the frequency of their meetings depending on the nature of the project they are engaged in, meeting more or less to support project goals. Meetings are recorded so anyone can follow or review discussions on their own schedule. Ongoing communication and collaboration is done via working group email lists and wikis. Working groups will occasionally run daylong live workshops and support remote participation.

### Mobile Broadband, Dave Clark and Bill Lehr

This working group is a follow up to the original Broadband Working Group. The issues addressed in [The Broadband Incentive Problem](#) are being revisited in today's context where wireless networking and content distribution (video in particular) are far more evolved. The key topics include understanding the broadband value chain and

ISP economics, new pricing models, and engineering for efficiency.

### **Interconnection, Bill Lehr**

This working group is currently inactive as a separate WG, with its on-going management subsumed under the relaunched Mobile Broadband WG. The focus of this WG was on interconnection issues, traffic analysis (as part of the MITAS -- MIT Internet Traffic Analysis Study -- project. This work includes engagement with the FCC in its broadband metrics work (e.g., SamKnows and "Need for Speed" Request for Comments and Notice of Inquiry on Broadband Reliability), as well as with the OECD Internet and Information Society metrics efforts, and with efforts to promote congestion accounting standards. Work on these projects is on-going and will be reported into CFP on a periodic basis.

### **Privacy and Security, Karen Sollins**

The Privacy and Security Working Group continues to focus on privacy more than other elements of security. In particular, the group concentrates on the intersection of identity and privacy in the context of communication.

We are currently defining a set of products in the area of trust frameworks and trustmarks. A trust framework defines a process for certifying the trustworthiness of identity, security, and privacy policies for parties exchanging credentials. Trust frameworks tend to be extremely general. As such, we see a significant need for specialization, especially with respect to the nature, degree and applicability of the trust being certified. In turn, trustmarks are the symbolic images indicating the results of the certification process, and, therefore, must be capable of expressing the richness of the results of the evaluation. After reviewing the current approaches to trust frameworks, our attention will focus on how to make trust frameworks and the trustmarks they generate more specialized or specific. In the longer run, CFP members are interested in their potential role in providing a trust framework and the ensuing trustmarks, from not only the technical, but also the business and regulatory perspectives.

The working group's original paper, *Identity in an Information Centric Internet*, examined the role of identity in the novel network architecture concept called "information centric networking." This novel approach reflects three significant transformational concepts: (1) a symmetric push and pull model of the flow of information, rather than the more traditional push only model; (2) an agnostic perspective on whether the communication is binary or multi-party; and (3) asynchrony with respect to information sources and sinks. In this context, this paper examines the challenges to identity and privacy.

The working group's successor project was *Social TV: A Study in Identity and Privacy*, which began with the previous work and examined questions of identity and privacy specifically in the evolving context of social TV, based on the early case study of Social TV in the Value Chain Dynamics Working Group. Here we decompose and examine the challenges faced by providing a usable model of privacy in a context in which some of the identity information and its related privacy policies are derived from supporting application domains, and some that is unique to the new application, that is based on supporting applications. Even a greatly simplified model of social TV leads to significant complexity in understanding and managing both identity information and the privacy policies for it. We also admit of an evolving set of supporting applications domains, which is more reflective of the evolutionary nature of what one might call "Social TV." A paper on this subject was presented at the IEEE ICCCN Workshop on Social Interactive Media Networking and Applications in August 2011.

In the recent past, the working group focused more narrowly on identity management services. This led to a series of invited talks by experts on a variety of related topics and projects, ranging from Kantara to Shibboleth to ABAC (Attribute Based Access Control) to many others. It also included various discussions and feedback from individual members on topics related to the Executive Branch National Strategy for Trusted Identities in Cyberspace (NSTIC).

### **Spectrum, Bill Lehr**

The Spectrum WG was re-launched in November 2012 to engage multidisciplinary work on Dynamic Spectrum Access (DSA) sharing models. The present focus is on the Authorized Shared Access (ASA) model proposed by Qualcomm and NSN, and closely related to the Licensed Shared Access (LSA) and Priority Access (PA) models that are under consideration in multiple forums in Europe and the United States. The PA model was discussed in the White House PCAST report on government spectrum sharing (released June 2012) and with ASA/LSA represents a new (third) model for managing spectrum access. In addition to this work, Dr. Lehr is engaged in a range of related wireless/spectrum research that will be reported into CFP on a periodic basis.

## Value Chain Dynamics, Charlie Fine and Natalie Klym

The Value Chain Dynamics working group looks at an industry value chain as an assembly of various service functions. We call these functions “control points” because they represent strategic opportunities for value creation and capture. We are interested in how control points change, particularly in response to triggers related to: technology, regulation, customer preferences and behaviors, business strategy, business cycles, industry structure, and capital markets. Triggers will cause new control points to emerge in the industry ecosystem, while others may disappear. Or they may cause changes in their configuration, i.e., from being tightly integrated (closed interfaces between control points) to loosely coupled or modular (open interfaces between control points). Generally speaking, we have observed a pattern of oscillation between vertically integrated and modular value chains, hypothesizing that an open structure invites new entrants, whereas a completely closed system will keep them out—until it snaps and breaks, and the cycle begins again.

Current research activities:

- The incumbent’s dilemma: Which disruptions matter? (Chintan Vaishnav and Sergey Naumov)
- Future of media (Natalie Klym)
- Sports over IP (Halil Kiper)
- Next Generation Revenue Model for Service Providers (Mohibi Hussein)

## Viral Spaces, Andy Lippman

The Viral Communications group began with the goal of designing grassroots systems that could scale smoothly and improve through that scaling. Our first example was radio, where we showed that local intelligence in the devices could obviate the need for rivalrous spectrum allocation. For the last few years, this work has extended to combine scalability with the social needs of people traversing a mobile, collaborative environment such as a city or workplace. Our emphasis broadly addresses the intersection of mobility with the environment. Our focus is on how we create technologies and applications that bring people into contact with the space around them for learning and information. We focus on a technical area called “proximal networks.” These are connections that are based on intentions and relationships rather than destinations. The Viral Working Group meets irregularly to review the research of the graduate students and discuss methods and issues.

Current Research activities:

**Ultimate Media:** Reimagining visual media in a world of extreme connectivity, processing, visual presence, scale and scope, social connectedness. Ultimate Media focuses on three areas: narrative exploration, synchronous social awareness, and media as an opportunity for expression rather than consumption. Projects address presentation and exploration environments.

**BTNZ:** A lightweight, simple environment interface intended to examine and foster social interaction in public spaces. The idea is to present a picture frame-like screen and a single, large button. The screen shows a changing set of one or two word attractors; pressing the button brings up a three sentence elaboration. Examples are <lunch: meetings ending at 2PM, leftovers available on 3- floor>, <drinks: Viral gang meeting for drinks at 6PM>. The design is deliberately simple, easily attended or avoided, and accepts tweets from the community to present new messages.

**Co-Sync:** An api and set of examples for precisely coordinating the time and clocking of diverse mobile devices. The goal is to get them to operate in synchrony. Intended as an open interface to allow synchronized applications. Examples include using one mobile as a microphone for a video being shot by another, using several mobile devices for recording or reproducing high fidelity sound, splicing movies and images from several devices into one tapestry.

**Brin.gy:** An evolution of Polychronis’ work on EGO. This is a dynamic, coordinated set of agents for creating immediate flash groups. Includes a “human discovery protocol” akin to DNS for discovering and registering goals and predicates. One can create free-form lists of topics and see if others in the area respond and join. Can be used for merchandizing, discovering places of common interest in new places, study groups, etc. Thesis available.

**Peddl:** A broadcast marketplace similar to classifieds where every message is a broadcast post to those in proximity. The intent is for a true market price for goods and services to emerge through transparent offers. Works on mobile devices. Thesis available, spin-off in progress.

**Barter/Beonten:** A market-based information exchange that replaces the static and rigid notions of contests and affinity points with an open market for information. Buyers and seller can trade, sell, aggregate, and venture ideas with a flexible bid and asked monetary system. The ultimate value of the currency is controllable and therebe designed to maintain interest in the market. Solves problems of stale and rarely used information systems where ideas get lost or participation flags with time. Thesis available; spinoff in progress.

**Everyday Edisons:** A new initiative intended to build innovative creativity and learning into common activities. Consists of prongs to address the design of things that expose and encourage exploration, community-based means to encourage interaction and learning in people (and organizations), and tools that teach. This is a new effort that includes collaboration in external communities such as Detroit, as well as technologies of exploration that use everyday devices in new ways.

**VR-Codes:** Data streams embedded invisibly in displays and readable by normal mobile cameras using software only. Related to QR codes and watermarks in that data are inserted into normal images, but the dynamics of the display permits hiding the data from the human eye and streaming data. An example is using a public display where each person can receive individual information by aiming a camera at it.

**The Glass Infrastructure** transforms kiosks into interpersonal exploration opportunities. We use RFID tags and a touch sensitive display to allow groups to share their experiences uncovering projects and ideas of interest. We have implemented this in the Media Lab to complement the glass walls that reveal the research. Behind the façade of the screen, we have opened up internal data bases and added functions to record and remember the experience of the place. Connections between projects and people is done using a commonsense-based natural language analysis of projects. Several sponsors are using this system in house.

**Electric Price Tags** (Rick Borovoy and Matt Blackshaw) are a realization of a mobile system that is linked to technology in physical space. The underlying theme is that being mobile can mean far more than focusing on a portable device – it can be the use of that device to unlock data and technology embedded in the environment. In its current version, users can reconfigure the price tags on a store shelf to display a desired metric (e.g., price, unit price, or calories). While this information is present on the boxes of the items for sale, comparisons would require individual analysis of each box. The visualization provided by Electric Price Tags allows users to view and filter information in physical space in ways that was previously possible only online.

## Current Membership

Cisco Systems  
Comcast Cable  
ESPN  
NBCU

Nokia Siemens Networks  
Samsung  
Telecom Italia  
United States Postal Service

## Contact Information

Communications Futures Program  
32 Vassar Street  
32-G820  
Cambridge, MA 02139  
Phone: 617-253-6002  
Fax: 617-253-2673

For more information about the program please contact our executive director, Natalie Klym at [nklym@cfp.mit.edu](mailto:nklym@cfp.mit.edu).

For administrative assistance, please contact Sue Perez at [susanperez@csail.mit.edu](mailto:susanperez@csail.mit.edu)

Map of MIT <http://whereis.mit.edu/map-jpg>

Getting to MIT <http://cfp.mit.edu/contact/directions.html>