

>> Erica Myers: Welcome back to the afternoon session. For those of you just arrive organize just tuning into the webcast, I'm Erica Myers, an attorney with the FTC. This afternoon, we'll explore some of the academic work dealing with markets for intellectual property and other issues. Each of the panelists will give a presentation and we'll leave about an hour for follow-up discussion. We have a seemingly diverse range of topics but at their root, they all address market failures, or potential solutions to those market failures in the emerging markets for intellectual property. First up will be Stuart Graham. Stu is an assistant professor of strategic management at the Georgia Institute of Technology and a Kaufman foundation fellow at the Berkeley center for law and technology at the University of California, Berkeley School of Law. Professor Graham teaches and conducts research on firm intellectual property strategies, intellectual property transactions and markets for technology, technology entrepreneurship, and the legal environment. Dr. Graham received his Ph.D. at the University of California, Berkeley, and holds advanced degrees in law, business, and geographical information systems. Next we will have Mark Lemley. Mark is a William H. Neukom professor of law at Stanford law school, the director of the Stanford program in law, science, and technology, and the director of Stanford's LLM program in law, science, and technology. He teaches intellectual property, computer and internet law, patent law and antitrust. He is a founding partner of a law firm of Durie, Tangri, where he litigates in the areas of antitrust, intellectual property, and computer law. He received his J.D. from Boalt Hall school of law at the University of California at Berkeley and his A.B. from Stanford University. After graduating from law school, he clerked for Dorothy Nelson on the United States Court of Appeals for the Ninth Circuit. Iain Cockburn will then share some empirical work. Iain is professor of finance and economics and Everett Lord distinguished faculty scholar at Boston University. He teaches and performs research in the areas of entrepreneurship, business strategy, intellectual property, economics of innovation and management of high-tech companies. Professor Cockburn graduated from the University of London in 1984 and completed his Ph.D. in economics at Harvard. Samson Vermont will follow Iain. Sam is an assistant professor of law at George Mason University law school, which I might add is an excellent law school, where he teaches patent law and torts. Before transitioning into academics, he practiced patent law in the Washington, D.C., office of Hunton and Williams. He is a registered patent attorney and the founder of the monthly periodical "Patent Strategy and Management." Between practice and starting at George Mason, he earned his LLM from the University of Virginia school of law and served as the Humphrey fellow in law and

economics at the University of Michigan law school. Finally, Polk Wagner will close with a discussion of patent portfolios. Polk is a professor of law at the University of Pennsylvania law school. Professor Wagner teaches his -- or focuses his research on teaching and intellectual property law and policy with a special interest in patent law. Professor Wagner founded the Fed Circuit Project, an ongoing effort to study the performance of the federal circuit. Prior to joining the Penn faculty, Wagner served as a clerk to Judge Raymond C. Clevenger III of the United States Court of Appeals for the federal circuit. He holds a law degree from Stanford, an engineering degree from the University of Michigan and was the 1994-95 Roger M. Jones fellow at the London school of economics. So, I will leave it to Stu to take it away.

>> Stuart Graham: Thank you. I'll try to use this clicker. When I got the call from Erica to come and speak about this subject, I started to review my current scholarship, and I have always thought of this, but it really became clear to me that a lot of my current scholarship actually touches on or is directly related to the question of how patents operate in the markets for technology. What I'm going to do is just give you a highlight into some of the findings of myself and co-authors, give you a list here of the research that I'm going to be highlighting in this presentation, some things I've been writing with co-authors over the last couple years. And this will be -- I believe this is going to be posted on the website ultimately?

>> Erica Myers Yes.

>> Stuart Graham: Okay. Terrific. So those will be the citations. The first thing I want to remark over is the idea that, you know, markets for technology, it's not just I.T.. We oftentimes, when we talk about the markets for technology, are thinking about electronics, information technologies. This is actually a chart out of a piece of work being put together currently in working paper form by some colleagues and myself at Georgia Tech. And what we're looking at is the markets for technology in the pharmaceutical industry. So, a couple things to say about this. First of all, you can see a lot of heterogeneity, so what this chart documents is we looked at the patents that are listed in the orange book for successful NDAs coming out of the Food and Drug Administration. And we actually looked at where those patents originated. And this percentage catalogs the percentage of patents that originated with an assignee outside of the firm. So, you can see there's a

lot of heterogeneity here. With some firms, Baxter, AstraZeneca, Bristol-Myers, et cetera, actually bringing many, if not all, of the patents associated with their most successful products from outside the firm all the way down to Merck. It has a relatively smaller share. So, two things. Number one is marks for technology are working outside of I.T., certainly in the pharmaceutical industry, as well, and also highlights for us that, while I know a lot of the discussion this morning was about the buying and selling of patents or patent portfolios, patents are being transacted via various methods - - licensing and certainly in the pharmaceutical context through -- through acquisitions, as well. Okay. Another piece of work I want to highlight, and this is -- this is still ongoing. We're getting results out of this now. I've been involved, while I spent last year as a Kaufman foundation fellow at UC Berkeley, in a comprehensive survey of high technology entrepreneurs. We styled this the 2008 Berkeley patent survey. It was led by the Berkeley center for law and technology at the UC Berkeley, law school. What we did is, we surveyed what we defined as entrepreneurial companies. These were essentially young firms, firms no older than ten years old in specific sectors, in biotechnology research, software, I.T., and internet-related and medical devices. Our sample included over 15,000 companies. We drew these from, you know, sample frames, Dunn and Bradstreet. Also, we over-sampled on venture back firms so we could take a view into these firms that are really key drivers of value and employment creation in the economy. We surveyed the mail-in web, and we had, ultimately, over 1,300 unique firm respondents. What did we learn from this that relates to the markets for technology? Well, some things. We did ask about the source of the revenues coming from these small firms. And what we found was, is that at the mean, firms are reporting less than 5% of their revenues are driving from licensing out. Now, the wording on this is very important, so let me actually tell you what the wording was. What we asked was, "How much of your revenue is derived from product sales, including other companies, sales of service to -- including other companies --," and the third item was licensing technologies not including product sales to end customers. So, this is the -- these are the statistics that I'm sharing with you now. There are, though, important differences. Statistically significant differences in sectors, so the biotechnology firms are more likely to answer that revenues are coming from this source. Medical devices less likely. And the I.T. software just about right at that mean. Other findings. Patents, we find, are significantly more important. We asked these firms to report on how important patenting was to securing competitive advantage from their -- from their technology innovations. And we found that patents are significantly more important to those young firms that generate more

of their revenues from technology licensing. So, as they report more of their revenues coming from this. They also were reporting to us that patents are more important than other -- than firms that are not reporting that. Generally, young firms are rating -- we also asked them questions about why they're patenting. And they generally rate obtaining licensing revenues as relatively unimportant compared to other reasons, such as preventing copying or enhancing the company's reputation. Of course, these themselves are wrapped up in the -- in the markets for technology in some sense. Here, too, sectors matter. Biotechnology rating -- rating these more important. But also, the least important among it, among all the alternatives but more important than do, say, I.T. or software. And as they are rating licensing more important, we also find that they are more likely to rate patents as important as a means of capturing value. Okay. Another piece of work that I am engaged in with some co-authors, Tim Simcoe and Mary Ann Feldman, this is -- let me actually skip by this to the words first, and then I'll cycle back. We've been looking at the relationship of patents and patent litigation in the standard-setting context. So, what we're able to show in our research. Well, the research shows that patents disclosed to standard-setting organizations are much more likely to be litigated. Okay? This is quality or, you know, people are putting crown jewels into this process as the case may be. Among the smaller firms -- we split our sample into large firms and small firms. What we found for the smaller firms is that the disclosure event, so when the -- when the firm actually discloses its patents to the standard-setting body, appears to be a triggering event for the litigation. So, that's what actually this shows. Okay? You can see here years since disclosure with the small firms as the solid line and the large firms as the broken line. All right? Significant spikes in the years following disclosure for the small firms. Okay? What we also found is there's no divergence in the quality measures of patents post-disclosure for large and small companies. So, what this enables us to do is to say that the results point towards a change in some strategy and not some higher demand for -- higher demand and increased, infringement, for instance. In some, what we find is small firms appear to be using their disclosed patents differently. Now, is this evidence of troll-like behavior? Well, not necessarily. We know from theory and from our investigations of the market that small firms are likely to compete on the upstream technologies, while the larger firms are competing on downstream implementation and product markets. So, it's not surprising that the smaller firms would have more of an incentive to care about the technology, because this is really where they are earning their rents, upstream. Okay? Lastly, I want to talk a little bit about improving a transactional environment. I'm going to

talk in the next few slides about work that I've done with a colleague from the University of Munich, Dietmar Harhoff, and we started off by thinking about what's going on in this transactional environment out there. Well, from theory we know there are welfare gains from the patent system. Yes, we all know that there are dead-weight losses associated with monopoly, but the benefits we expect are incentives to invent, to develop, to commercialize and to transact, right? These things also create for us an opportunity to have a transactable piece, chunk, and we also think about the knowledge spillovers that come from disclosure. But at the end of the day, a patent system will tend to experience welfare losses when it has forces operating on it like low quality, okay, patents that are lacking requisite novelty, et cetera. Also, uncertainty, whether that uncertainty be over the final boundaries of the disclosure, over the validity of the property right itself. And this uncertainty, as I add on this final bullet point, we theorize would add transaction cost to commercialization, technology transfer, and developing markets for intellectual property. So, what Harhoff and I did -- and I'm not going to walk you through these, but what we tried to do was go through a welfare calculation of adopting a post grant review in the U.S. The way in which we did this -- and I'll point you to the working paper if you're interested -- we actually looked at a cohort of U.S. patents that had been litigated and then matched those through their documentation, their priority documentation, to their equivalent patents in the European system. And then we took map samples and we compared and contrasted these. And what it enabled us to do is come up with probabilities of the likelihood of opposition in a system like the United States. Okay? So, we ran these through and here's the tables, okay? All right? I'm not going to -- I'm not going to say too much about these other than to say what we did with these is we used in millions of dollars, we tried various amounts for the social cost of litigation, the social cost of a nonlitigated revocable patent, because we realized that in a system like the United States there are a lot of patents out there that are not being revoked because the system is so expensive, right? We have a lot of estimates here on the probability of opposition, the probability of appeal, and then we try also some sensitivity analysis associated with different costs for the opposition, the post grant process itself. Right? And then we do some welfare calculations. Okay? If I can get that to actually come up. There we go. Well, it comes up, and then it goes away. The green circle. But let me point you to this. Okay? What we find is so long as opposition costs are relatively low, this would be in millions of dollars, \$100,000, both for opposition and appeal, right? We can experience some significant welfare gains, all right, not only from avoided litigation, but the big kicker for us and

what we found in the European system is because opposition had been so much more, they are getting rid of a lot more patents that pose monopoly costs to the system. Okay? So, you get a substantial boost from an opposition system because there's more of it, it's a lower cost, right, and you're able to comb out those patents that are not being litigated in the United States, right, but still are imposing welfare costs on society. Okay? At the end of the day, what we found was, in our best scenarios, a 15:1 ratio of benefits to cost. Okay? But, caveat -- because when we let the opposition costs rise significantly, here up to \$500,000, okay, you can see you can see the benefits really start to erode. So, our findings are very, very sensitive to the costs of that system. Okay? So, if there's one thing that comes out of this research is don't let those costs get out of hand if we are going to have a system like that. And this is actually something that Levin and Levin had pointed to in an early article, as well, although without specific calculations behind it. Okay? So, in sum, patents in the markets for technology are relevant beyond electronics. We still have much to learn, particularly with regard to the relationship among patenting these markets and technology entrepreneurship. And I would always point to the substantial inefficiencies in this transactional environment. I know we're going to talk about this a little bit in the question and answer today. But reducing uncertainty over the boundaries of the validity of patents would tend to dampen some of these inefficiencies, and post grant review as a means to increase society's welfare looks promising, again, if the costs of the process remain relatively low.

>> Mark Lemley: Stu's conclusion is actually a perfect segue way to my introduction because I want to talk about inefficiencies in the transacting market environment. Let me begin by saying I think that a market for technology is a good idea. It's something that we should be in the business of exploring and promoting, but that the markets for technology we have, markets in particular for patent licensing we have right now, are not particularly well-developed markets. We've made baby steps towards a real market for technology transfer. Most of the technology transfer that occurs occurs in one-off secret deals between parties who happen to find each other either through prior business relationship, perhaps by accident, or more commonly through litigation, which they end up settling. There is a nascent market, a public market for an auction of patented technology, but it really is a nascent market. And if you look at the most recent Ocean Tomo auction results, you see a relatively small number of patents being sold for a relatively small amount of money. Compare that to the vast number of patents out there, and even to the substantially larger number of patents

that are licensed or sold in some other mechanism. So, the problem is the market is thin. All right? I don't have a bunch of willing buyers, a bunch of willing sellers interacting with each other in a normal market environment. We have people who find each other on an occasional one-off basis where we have a very, very small, thin market for auction of a patent system. And thin markets are inefficient. Thin markets don't work well. They don't drive you to the right price. They leave a lot of transactional money on the table in the sense that transactions that should have occurred that would benefit both the buyer and seller don't occur. Why is this? I think there are a number of problems, but I want to focus on three problems which I think are interrelated. The first is the lack of transparency. Licensing and patent sale transactions occur with very few exceptions, which we'll talk about in a minute, in secret. Nobody knows when the transactions are going to occur, when they are under consideration. Nobody knows the price at which patents are sold or licensed or the terms under which those prices or licenses take place. Second, and I think closely related, is the problem of a market for lemons. This is a familiar problem in other areas of technology. If I cannot accurately assess the value of the thing that I am buying up front when I buy it, then we end up in a world in which it's easy to sell the lousy products. It's hard for customers to distinguish the good from the lousy products, and so the lousy products end up driving out the good products. So, there's a substantial risk that, if we're putting up product patents, whose value is unknown, we are unlikely to get anything like the full value of that patent in a market sale because people are afraid of being taken. And third is the problem of uncertainty, not just uncertainty in the value proposition, but uncertainty throughout the entire range of the patent system. It is virtually impossible for anybody to know in most industries most of the time whether a patent that they're looking at is valid or invalid. What that patent covers, and, therefore, whether or not it's likely to be infringed. So, the range of uncertainty is something that I think fundamentally distinguishes intellectual property markets from markets for other kind of either land or chattels. The level of uncertainty we're talking about here is quite significant, and the combination, I think, of these effects, coupled with the fact that there are so many patents out there, has led for other reasons to circumstance in which most companies making products in most industries, not all, but most of them, ignore patents. They just don't pay attention to them unless and until they are forcibly brought to their attention either by the filing of a lawsuit or at least by repeated demand letters. And that, too, I think, leads to the -- it supplements and reinforces the other problems we're talking about. It adds to the thinness of the market. Well, it would be nice to solve all of these problems. I

frankly think some of them are not solvable. I would like to see less uncertainty in the patent world. I'd like us to have a better sense of whether patents are valid or not. I'd like us to have a better sense of what it is patents cover and clearer claim construction. But to some extent, I think that's a fool's errand. We may get increased certainty. We are not going to get certainty in anything like what we mean by certainty in other market environments. There is no plausible amount of money we could spend at the patent office that would weed out all the bad patents and guarantee us that the remaining ones are, in fact, good. And I think there may simply will no way, given the legal regime of claim construction, to understand in most industries what it is exactly that a patent covers under the existing peripheral claiming system. So, I'm not sure we can solve the uncertainty problems. I think we clearly can and should solve the transparency problem. What's remarkable, if you step back outside the intellectual property environment and look at it in the context of markets, is the fact that all these transactions occur in secret. That's not a necessary fact. In fact, in any other market, we would think it a bizarre thing. So, we have stock markets that work because I know not just the price I'm willing to pay for a particular share of Google stock, I know the price that everybody else was willing to pay for a share of Google stock yesterday, and I know the price at which people are willing to sell that stock. We know that because we've taken information, the price of a transaction, and we have required it to be publicly disclosed. We can and should do the same thing with patent licensing. The fact that we don't, I think, conditions a lot of people to think, well, of course, the license, the transaction, the sale must be a secret transaction. But there's no reason that should be true. In fact, the Federal Trade Commission for other purposes has embarked on an experiment over the last several years of requiring the disclosure of pharmaceutical settlement agreements through license. That requirement has not, in fact, deterred people from entering into settlement agreements. It unfortunately hasn't even occurred -- deterred them from entering into anti-competitive settlement agreements. But it certainly has not caused people to forgo entering into licenses. If we broaden that experiment, if we actually start requiring people to disclose the substance of their licensing transactions -- the royalty rates they pay, the prices they pay -- then we're going to start to get information that will help make a market thick. Now I can figure out, okay, this is a valuable patent. People are willing to pay a lot of money for this. This is not so valuable. I can start to make class distinctions. Patents that look like this, patents in this industry, patents produced by this company, patents produced by this law firm look like they have a higher value than other patents in this context. We can start to develop a thick market. I think

transparency in license and sale pricing of patents would have other advantages, as well. Most notably, it would help rationalize the patent damage system. We currently base patent damages, in most cases, on an assessment of the reasonable royalties the parties would have entered into had they, in fact, not chosen to spend \$5 million per site litigating all the way to trial. Where do we get that reasonable royalty number? Well, we get it based on licensed transaction information. But we don't have licensed transaction information for the overwhelming majority of licenses because those licenses are kept secret. So, we take a small and nonrepresentative subset of available data, we look under the lamp post, if you will, and we say, well, okay, that's what must be all there is out there. Publishing, requiring transparency of license pricing, would have as a second substantial benefit the benefit of actually giving courts information as to what a reasonable royalty in a particular industry was likely to be. We could probably solve the patent damages issues that are currently bedeviling Congress and the courts not by changing the legal rules but by actually having real, accurate information about reasonable royalties in this transaction. And I think that transparency is going to help in other respects, as well. I think it will help with the market for lemons, right? If we start identifying the characteristics of valuable patents, people will be more comfortable paying for those valuable patents. They won't be driven out by the ones that are potentially problematic. And I think transparency and information helps with other market rationalizations that would be desirable in a thickening market. We could start to see securitization of patent interests. I know that's a bad word in the current economic environment, right, but it's nonetheless I think a desirable way of not eliminating uncertainty but reducing that uncertainty. I think we could start to see the development of insurance products, which you might call patent royalty trusts, in which people can try to solve the royalty staffing and standard-setting problems by figuring out a rational value that ought to be attributed to patent contributors to a technology and insuring against the risk that courts are going to award a greater set of damages or so forth. We don't see those products now. We don't see those products now because nobody has a baseline against which to measure any of this information. And I think an important first step that we could take in improving a patent market is to give us that baseline. Thank you.

>> Iain Cockburn: Good afternoon. Thank you for the opportunity to speak. What I thought I would do is report on some of the findings from a series of surveys that the LES foundation has sponsored over the years giving perspective, if you like, of the view from the trenches. We had

some practitioners this morning that are little one step up from that attempt to establish some statistical picture of this or a quantitative picture of it rather than just anecdotal experiences of specific individuals. These foundation surveys have been done for five years now, and I'd like to acknowledge the leadership of Richard and Luke Bernaman, the LES foundation board and Ken sitting in the back there was extremely helpful in these enterprises. What we did was, you know, survey the LES membership and an important prefatory remark is that LES members are not necessarily representative of all or, indeed, necessary many of the people who are affected by the markets for technology, but, you know, they're an important subgroup. I'll refer you to the various articles being published annually in "LES Nouvelle" over the years summarizing these results, and I see there's a typo here on the slide. The latest article and it just came out in the March edition of "LES nouvelle." My take on what we found from these years of asking various questions, some of them repeated times, is captured on this slide, and one of which is the I.P. disputes are widespread. In any given year about a third of the LES membership would say they would be involved in a dispute. It's important recognize it's not one-third of their time or one-third of their resources. In fact, they would consistently report 80% or 90% of their time is spent on opportunity licensing, business development and transferring and using technology rather than wrangling about property rights. I think the second big lesson that I, at least, have drawn from this effort is that licensing is much harder than you think, especially if by "you," you mean somebody who went to graduate school in economics and thinks about these problems in an abstract way. Professor Lemley just referred to concerns many people have about the efficiency with which this market operates. I'll offer the following observations, that, you know, while about one-third I.P. inventory of the kinds of companies that LES members belong to would never be on the market. They're regarded as being, you know, core technology or strategically important, of the two-thirds that are left, you know, a great deal seems to be stuck on the shelf. This is retrospective, and the practitioner discussion this morning suggested there may in fact be you know, rapid evolution of institutions that would encourage moving some of this stuff off the shelf, but the fact is in these surveys these folks will consistently report about 50% of the stuff they don't want they acknowledge will never be transacted in. A related point is that deals are difficult to do. Even if you can find somebody in this -- well that Professor Lemley characterized as behind closed doors, even if you can find somebody to negotiate with, very frequently negotiations won't reach an agreement. These are most consenting parties looking for an opportunity to transact rather than an enforcement situation.

And usually that's because they simply are very far apart on price, and no amount of negotiating is going to get them to the point at which they can actually voluntarily do the deal. Reflecting that is something which I found, you know, somebody makes their living teaching MBA students how to be spreadsheet jockeys, it is a profoundly depressing finding for me at least, you know, two-thirds of the time, even in executed deals, nobody had a formal evaluation model. The amount of talking you can do about the classroom about real options and binomial trees and all the rest of it doesn't translate into business practice and presumably for very good reasons. And lastly is the observation that, you know, one of the ways these deals are difficult to do is that the prospective, they're facing a changing environment. If you ask the question, think about the deals you did last year. Many of the respondents of this survey would say, well, they'd really like to revisit them and revisit them substantively. All that points to these things being difficult to do. Let me move quickly through these slides, just highlight a couple of them. Okay, I skipped past the one I wanted to talk about. Here we go. This is a question we put to respondents of this survey, which is, you know, is I.P. different, in the sense of how different is it from a, you know, similarly large and complex transaction, something like a commercial real estate leasing deal or a contract for use of specialized production facilities. What you can see is that you know these I.P. deals are very difficult to deal with. You know, these reflect the thinness of markets, the number of, you know, internal business resources that have to be put on this, difficulties in bringing deals to closure, and so forth. You know, I.P. is just tough to deal with in a practical business sense. What I did promise FTC staff I would spend time is the questions about patent trolls. For several years we asked a question of the definition of "troll" is roughly coincident with what I think people mean by nonproducing entity. So, we put this question suggesting, that well, look, this threat of litigation by MPEs somewhat similar to, you know, the sort of most -- the kind which generates the most yelling and shouting and appears to be opportunistic behavior, not closely related to actual inventive activity. You know, is it like slip and fall? You know, the sort of constant background noise of litigation that business faces or is it something that shows substantive impact. So, you can see on this slide a summary of findings. You know, for most of the respondents of this survey, they got -- they got to say, look, it didn't have a substantial impact. It really sort of looks like a slip-and-fall type of problem, but with one sort of glaring exception, I think this just quantifies what many of us know already, that this is represented as being a big problem for the companies in the I.T. sector. That comes from digital information communications and electronics. A third of those respondents are going to say that this

is a substantial problem. Having agreed what they would characterize as a problem, the question then arises, you know, what was its actual impact? You know, does it change things in the economy or impact the progress of science and the useful arts? Again, you know, asking for all respondents across all sectors of the economy in this survey, at least, you know, few of them seemed to do anything with the exception of the I.T. folks. So, you can see that in I.T. the actual potential for opportunistic litigation by MPEs, you know, some of them will decline to pursue an otherwise attractive opportunity, some of them will decrease investment, some of them will abandon R&D projects. But most of the time, you know, even in the -- even in the I.T. sector, the response is really don't do very much. So, I think that though there's a lot of smoke here, the fire in terms of is it affecting the R&D process, are these companies substantially changing the way they go to markets, you know, we don't see any strong evidence, at least here. What you do see, I think, is, however, some response to this. You know, maybe we don't see any impact because the companies affected do a few sensible things to mitigate it. And, you know, we've asked over the years, do you do things like proactively compile collections of prior art? Do you file re-examination requests? Do you put together a joint defense agreement? And, again, you know, not very much anywhere, but a lot of it is going on in the I.T. sector. So, those were the formal charts I prepared. Let me just offer a few additional remarks. I think I'm the -- Stu is kind of an economist, but I'm definitely the card-carrying economist on this panel. You know, why do we care about this issue? I think from 30,000 feet almost everybody agrees that markets for technology are really kind of important, and there are potentially very big deficiency gains to the economy utilizing the resources of small and independent inventors more effectively. For example, division of labor is the phrase we like to throw around. There you get -- if you have a market for technology, you can get specialization in invention and specialization in production and distribution and, you know, since Adam Smith, economists have agreed that this is a profoundly good thing and has benefits for everybody concerned. The nervousness I have about this -- about this question agreeing there are potentially very large gains is that once we move to the idea of a market for technology and the pricing particularly of early stage research explicitly through acquisitions or terms of license deals or so forth, you know, we've put a set of prices on the technology which the utilizers or commercializers downstream will respond to and upstream people will always respond to. So, the price mechanism in economics plays a very important role in allocating resources. Now, that's all great if the prices are the right prices as an economist would understand them. If the prices are

wrong, that is to say, they reflect market failures in the market for technology, then resources are going to get steered in the wrong directions. And so, I think this is -- you know, it's a first order longtime question to think about if we care about economic growth and competitiveness and so forth is to understand, you know, whether or not the prices in these markets, you know, are, indeed, right, or do they deviate from, you know, reflecting the marginal opportunity cost of the resources employed or whatever it is that a theoretician interested in growth would focus on. And I think we should, indeed, be a little bit skeptical here. You know, back in economics 101, the market we teach which has the most egregious market failures in which the markets are most likely to be wrong is the market for knowledge because of all the obvious problems related to information, public goods, so on and so on and so on. Now, are the institutions involved able to solve some of these problems? You know, I think they may well be, and I'm personally very encouraged by the, you know, the discussion this morning from practitioners who are pointing out the very rapidly moving frontier, the emergence of new institutions who seem to be solving some of the problems in these markets, the potential for using ideas taken from finance, securitization, derivatives and so forth as ways of bringing more volume, more liquidity and more pricing efficiency. I think those are all very encouraging. What I do think we should be somewhat concerned is, you know, the limits on this activity, you know, how far can these new institutions or new contracts or new players go towards solving some of the ways in which the system seems to be broken? And I think it's -- I've thought about this quite a lot, and my answer is well, too early to tell. We're really going to have to see how all of this plays out. So, I think I'll leave it off at that and look forward to an interesting panel discussion. Thank you.

>> Samson Vermont: Hi. So, the industry panel earlier -- earlier today made reference to independent inventors a number of times, and what they had in mind were, when they were using the term "independent inventor," was a small inventor, someone who's not part of a big organization. That's -- I'm going to talk about independent inventors, but that's not what I mean by an independent inventor. For me, independent inventor means someone who didn't copy the invention. A second inventor, someone who didn't -- I'm sorry -- didn't copy the patentee's invention, so the second inventor comes along, doesn't know about the patent or doesn't see the patent and independently comes up with the subject matter. So, there's no free riding. The second inventor incurs costs of invention. Now, I've argued before that independent invention should be a

defense to patent infringement provided that the independent inventor completes the invention prior to receiving actual or constructive notice that somebody else already invented it, either the patentee or the first inventor. Now, since I made that proposal, there's some new data, some new books, some new work that's come out. "Patent Failure," a book by Jim Bessen and Michael Meurer. Mark and Chris Catropia's work, a study showing that the amount of patent' infringement litigation that concerns actual copying is very, very low, at least outside of the pharmaceutical industry. And then I also became aware of Mark's paper on ignoring patents. And in that paper, he points out that in some industries, it's routine component industries, mostly I.T., it's routine to completely ignore patents. All right. So, what do we make of this and how does this affect the independent invention defense? Does this militate -- this new information, does this militate in favor of the defense or against it? I think actually it's for it. I think there -- we have to ask, why is it that patents are being ignored in these component industries? Now, one reason is that the costs of clearance are very high, and a big part of that is simply that the notice function of patents is not serving well. Right? It's hard to know what patents -- what claims cover. Their validity's often uncertain, and you can have an enormous number of claims overlapping on a final end product. Another reason I think that companies routinely -- and some industries routinely ignore patents -- that there's just no information in those patents. There's no technological information in those patents that will help them do anything. Right? The only thing that they get from learning -- from finding these patents is they learn what their liability would be. They get information about what claims someone might make against them, but they don't get any -- they don't tend to get information out of the specifications that's going to help them invent or do what they're doing, make a product more efficiently. All right. So, what do they gain -- what do you gain by performing clearance if you're in one of these component industries? In the best case, you reduce the variance in your final outcome. Right? So, if you go ahead without planning, you could escape detection. You might never get caught. I mean, if your transaction cost -- if it costs you a lot to search and find patents out there, it might cost the patentees a lot to find you. Right? So, you might get away with it. You might never get sued. Or alternatively, you might get slammed, right? Your product might read on a claim that covers something that would be very expensive for you to switch out of. So, you do get -- in the best-case scenario, you reduce the variance in your outcome, you reduce the uncertainty that you're facing a little bit. The worst-case scenario is that you just increase your expected liability. You increase your downside by coming to the attention of these patentees. So,

you incur clearance costs, you spend money, then find them and say, oh, by the way, I may be infringing your patent. And, you know, hopefully you work out a deal, but if you don't, you have flagged yourself, right, as a potential infringer. You may actually increase your expected liability. Now, it's disconcerting at first glance to think, well, gosh, these companies are ignoring patents left and right. That doesn't seem right, you know. We should -- I think the initial impulse is to think, well, there's something, we should do something to prevent that. For example, enhance damages for failure to search. So, if you willfully infringe, if you knowingly infringe a patent now, damages can be enhanced against you. Maybe we could have some similar rule for failure to search. But this would be, I think, a bad idea for several reasons. One is it would delay innovation. Right? If we're going to make the penalty Draconian for failure to search, we're going to force companies to search prior to engaging, prior to developing their product and commercializing the product, we're going to delay innovation. We're going to delay, we're going to postpone the time at which inventions actually get commercialized and move into the market so that people can use them. Especially in a world where the PTO has a backlog of 1.2 million applications, and we're, you know, approaching four or five years on average for an application to get from filing to issuance. Separately, it would seem to make sense that -- it would seem a good, solid, general principle that, if the costs of searching, if the costs of clearance exceed the cost of independently inventing the thing, well, then, in general, we would want, you would think, at least on first pass, we would want parties to independently invent, right? It's wasteful to spend a million dollars searching to find inventions that may be claimed somewhere if you can make the invention yourself for \$50,000. Now, under current law, where we -- the law doesn't currently recognize independent invention as a defense, we still have parties not searching, right? Suggesting the transactions costs are really high because they're facing this, you know, high expected liability. There's reason to think, as is suggested, that there's too much searching, even, under current law, and that, if anything, we want to limit damages or limit -- or reduce expected liability in cases of independent invention. Now, as soon as you say that, you think, well, okay, that's going to reduce the expected rewards of the patentee, right? The patent is going to be worthless, and, yes, it is, but that's what we want in a situation where the invention would have come soon anyway, right? A patent that -- the purpose of patents essentially is to accelerate innovation, to get us inventions faster than we would have them in the absence of a patent system. So, if an invention would have come six months later after the patentee had invented, if it would have come six months later in the absence of the patent system,

then all that the patent has done is given us six months of use of that invention. Now, in some cases, it would have been 20 years or more before the invention came in the absence of the patent system. Those patents are worth more. So, if the independent invention occurs quickly after the initial invention, that is strong evidence that the value of the patent should be lower right? Because the private value to the patentee. Because there are costs associated with patents. There are social costs associated with patents. And we don't want to pay anymore of those costs than we have to. So, how do we incorporate -- how do we -- how does the law take account of independent invention? Now, I had proposed, you know, essentially that there would be a change in the statute so that if there was independent invention prior to receiving actual constructive notice that someone else had invented, then there's complete defense for this party, to reinvent the independent inventor. But I've become, you know, there would be a lot of division on this, right. This would be a very controversial proposal. Chemistry, pharmaceuticals, independent invention is quite rare there, at least with respect to small molecules. They probably shouldn't care too much about it because it's not going to affect them. But in other areas, software, for example, parties that are -- consider themselves beneficiaries of the patent system, they're very much going to be against independent invention defense, and parties that consider themselves victims of the patent system, they're -- you know, should be in favor of it. So, there would be a lot of acrimony, and it just may not get -- you know, realistically speaking, it may never get passed. So, I've kind of come around to thinking that Mark is right in thinking that it's really the courts who should take this into account, and they can do that by considering the fact that someone independently invented as a factor, militating against imposition of a permanent injunction. They can take this -- we could reserve willfulness damages for pirates, right, for someone who actually copies. And we can go a little further than that on damages by means of the foreseeability standard. So, under some of the federal circuit case law -- some of the federal circuit case law says that foreseeable damages are generally compensable. But in a world where the vast majority of the infringement is actually inadvertent, you never even foresaw that you were going to infringe, you know, much less what the consequences were going to be. Perhaps we should -- so, we have to -- I guess we have to adopt a fiction to some extent that you foresaw infringing. But we can curtail the -- we can apply the foreseeability requirement differently in the cases of independent invention by saying, look, okay, we will foresee that you could infringe the patent even though you didn't know about it, but we're not going to say that you could foresee the loss of collateral sales, convoyed goods, derivative goods, right, so we can shrink

the umbrella of liable that way. Mark and my colleague suggested that obviousness, the non-obviousness standard is another lever by which we can take into account independent invention. And this -- this is a nice way to do it because it makes the case law actually more coherent or would make the law more coherent. So, under current law, long-felt need for an invention and the failure of others are considered objective indicators that an invention is non-obvious. Well, if those were objective indicators that an invention is non-obvious, then you would think, short-felt need. Like, in other words, as soon as there was a demand, boom, the product showed up, and success of others, meaning multiple parties converged on it at roughly the same time, would militate in favor of obviousness. There would be an objective indicator of obviousness. Now, one possible downside is that would blow the patent up. Right? So, the patent is obvious -- the claim is obvious then the patent's destroyed. The reinvention defense I actually proposed was more moderate, and it would only give a defense to the independent inventor. It would not invalidate the patent. But from a probabilistic standpoint in considering the fact that obviousness -- that these are secondary indicia, they're competing with the other secondary indicia, and that they're secondary and not primary indicia, maybe that the effect is sufficiently continued that it wouldn't duly undermine incentives to invent. I guess that's all I have for now. Thank you.

>> Polk Wagner: All right. Thank you very much to the FTC and Suzanne and Erica for inviting me, and I appreciate all of you who came to watch. So, what they asked me to talk about was patent portfolios. And my partner in crime on this is my colleague, Gideon Parchamowski, who would be glad to answer any questions you might have about this if you let me know. So, most of the time when we talk about patents, particularly in the legal academic community, we are paradigmatically thinking of single, individual patents. And most of the analysis occurs at that level which, you know, we started questioning when we started thinking about this, right? So, you know, thinking broadly about what the value of patents is, or if they have value what is it, traditionally, you think that patents have -- you know, it's some sort of expected value via the right to exclude others from the marketplace, and it's useful in a variety of ways, to have the right to exclude others from the marketplace. But increasingly, people who think about this have growing doubts about this. And when you look at average value on almost any set of estimates that you've looked at across all patents, very likely to be insignificant value and most, if not many -- well, many if not actually most cases less and maybe even significantly less than the acquisition cost of

those patents. We know that patents have an extreme skew in distribution of value and the vast majority of patents have very little apparent value. And, perhaps as importantly, there's very little or even no outstanding visibility to distinguish the valuable patents from the less valuable patents. Now, some of this we heard from this morning in theory might change if we had a robust market, secondary market that, in fact, did some of these functions of estimating value. But I think, as even the people on the morning panel would agree, we're not there yet. And we certainly haven't been there in our recent history, which is -- you know, this is primarily describing. So, you know, we describe this in a sense as the patent paradox, which is if most patents, and, in fact, almost all patents have little or no apparent value, maybe even have negative expected value, then why are all these companies, in particular large companies, patenting at increasingly heavy rates, almost no matter which way you look at the measurements of patenting those increase? And the idea here is what they're doing is instead of -- they're not actually interested in patents is the theory here. They're actually interested in portfolios. And what they're doing is adopting a strategy of high-volume, low-quality, low-cost patents to build their portfolio. And in that sense, patents are a means to an end rather than the end themselves, and we need to think about that when we think about policies related to patents and how to understand them. There are other views, of course, out there in the legal academic community that patents confer other benefits, right? We've seen Clarissa Long's theory that patents might be signals, they can save information about the firm, they can be used as internal metrics. We see that every now and again. Some people theorize that they're just a lottery. People are essentially just playing the lottery with patents. And many people say that what people are doing, what firms are doing by patenting very heavily is just playing defense, amassing large quantities of patents to prevent other people from amassing large quantities of patents and suing them. So the basic theory, which in a sense, integrates all of these prior approaches is to say the modern value of patents lies, in fact, not in any individual significance, although there are certainly individually significant patents out there. But primarily in their aggregation to a portfolio. And the sense here is that whole is greater than the sum of its parts and you need to understand patents as an input to portfolio construction rather than as the actual goal of having the patents. What you're buying with a patent strategy is a portfolio and not simply a collection of patents. And that, then, suggests that patenting will occur when the marginal benefit of building a portfolio exceeds the marginal costs of acquiring the patent itself, which implies a higher rate of patenting than you might otherwise expect given the substantial benefits of the

portfolio and reveals that patenting decisions can often be and might in fact always be in some cases unrelated to the value of the underlying patents. So, why do companies do this? And so, we explore some of these issues. We have a few case studies and a paper. We look at certain companies that drop their R&D at the same time they radically increase their patenting activity and find this sort of thing going on, which is, they're using them in two ways. One we call sort of super patents, which is, in order to really have a right to exclude in a marketplace, in the modern patent law, you need a lot of patents. Both because you need to have room to operate for future innovation if you're a company that's doing a fair amount of future innovation. You can use a set of patents to attract related inventions to your company if you can build up a scale of patents that keep people out of your marketplace. You can, in fact, attract inventions. It avoids litigation. We heard a lot about that this morning, about how people -- one of the strategies of litigation avoidance is to throw your own stack of patents onto the table and tell your opponent to deal with that. It increases your voice in the political economy of the patent system, which is becoming, as patent reform gets to be closer and closer to reality, becomes a more important feature. We've seen the I.T. industry, in particular, become very active with a voice in the politics of the patent system recently, which I think is likely to work out to their benefit in some way, and enhances efforts to attract capital. The other reason you use it is for just hedging purposes. It addresses a lot of uncertainty to have lots of patents. You are no longer relying on any particular patent or any even particular specific technology or invention, expand your freedom of R&D in the future, future market conditions, future competitors, and patent law, right? So, if the federal circuit changed the written description requirement tomorrow, half your patents might be invalid, but if you have still 10,000 patents, you know, a few thousand of them are probably still likely to be valid so you have less concern in that regard. So, the current high patent intensity would be the expected consequence, this is of the rise in patent portfolios and not really a paradox. The value -- individual patent value is unrelated to patenting decisions. If anything, you might think of this as an inverse relationship, meaning as patent value becomes more diminished or even uncertain, the only strategy you have to sort of defeat that as a player in the patent system is to get more -- a larger portfolio and, therefore, more patents. So, in fact, there might be increasing feedback effects to this as we go further along. It explains a lot of patenting patterns that we actually see out there. Large firms patent a lot. Small firms seem to patent more carefully. So, firm size, experience, portfolio affects differently since it's not -- simply not possible usually for smaller firms to develop the portfolio that a larger firm would

and participate in sort of a full portfolio market. We see a slight increase in share of patents for small firms, and then patent litigation patterns, if you have less patents, you tend to litigate more so you have lesser -- in that sense, lesser portfolio effects. They don't help you as much. So, what are the implications of this over the long run? We think the net effects are probably mostly negative. I mean, I think that a lot of this is suggesting a more complicated and costly patent system that's harder to deal with on a number of levels. It's going to have significant distributional effects if more companies adopt or continue to adopt a high-volume, low-quality strategy, meaning you need a lot of resources to play this game and smaller firms or universities that have less cash to spend on patents are going to be in a sense locked out of this game. And potentially some significant anti-competitive effects. If it's, in fact, true which we are pretty sure it is, that a lot of the transactions that are going on now are via very large collections of patents portfolios, then that is definitely something to be worried about from a competition perspective because the larger that sort of scope of technology that people are cross licensing, the more likely it is that they're managing to cause anti-competitive effects. There are possibly some advantages to this. Right? And you're going to generate a lot of additional disclosure. Even though I think I agree with Sam that in most cases we don't think of patents themselves as containing a lot of useful technical disclosure, but that is not of course, the limit of what patents provide disclosure for, right? The fact that people patent means that then they go on and they get papers or they produce products or they do other things that then provide the information about the innovation, even if the patent itself isn't a particularly great medium for transferring the technological knowledge. A portfolio-focused innovation strategy, if you're really serious about sort of crafting a patent portfolio, really thinking about where the gaps are in your technology that you want to go and invent and be very careful about what you're doing in terms of building portfolios, that, in terms of sort of social benefits, might be quite beneficial because it suggests that people are, in fact, doing a deep analysis of what kinds of patents they're getting and why. We are not sure that most of the companies that we -- certainly, not the ones we studied in any detail are doing this. It seems more like they're just throwing a lot of money at a problem and trying to generate as many patents as possible. But you can imagine a portfolio building structure, a scenario or strategy where people were actually doing things sort of in the way that you would want in terms of supporting innovation. And another advantage is it certainly is clear that a lot of firms are staying in the patent system. And one of the things we need to think about is -- in terms of policy, the patent system, is there are alternative mechanisms for protecting

your knowledge assets. Trade secret is a primary one. Other things, not patenting at all, changing the design of your product so as to avoid discovery, different kinds of license agreements. There are ways to protect your assets without getting in the patent system. Many of these ways from a social perspective, at least in my view, are more negative than the patent system, even with the problems the patent system has. So, at least as people are engaging in a portfolio strategy, they are in the patent system and then in that sense can be reached by patent reforms. There are, of course -- and more of my recent work has gone into the fact that this high-volume, low-quality strategy actually complements a bunch of other incentive effects that we currently see in the patent system. Right now, the patent system strongly encourages patentees to defer clarity at all costs, which means basically avoid telling people what your patent says, particularly the PTO at an early date, defer as much as you can any detailed explanation of what your claim terms mean. Don't disclose any more than you absolutely have to. There is a variety of legal doctrines that are causing this problem. I think all of these are deeply unfortunate and are simply encouraging people to make their patents as unclear as possible. It's a perfectly rational strategy, by the way, on the part of the patentee to do this, and it has, I think, very strong, negative consequences. This also feeds into institutional incentives. Right? We've got major problems with -- you know, the PTO has a major political problem in that there appears to be about a million patent applications sitting on desks and a lot of people agitating for them to get that backlog clear. We can certainly predict one way they're going to do it, which is simply to start issuing a lot more patents, and that, I think, is not likely to be a good result. It also feeds into some cognitive biases that I'm happy to go into during the Q&A. It suggests that these incentives supporting this high-volume, low-quality strategy are pretty durable, sort of structural to the patent system, and it leads me to the conclusion that they're going to be pretty difficult to attack in any meaningful way, and any solution is going to be a pretty costly tradeoff. I actually spent last fall in Japan because there's this sense among a lot of academics and people in the patent system that, whatever they're doing in their patent system is better. They're doing sort of a better patent quality job. And the bottom line, I found absolutely no evidence to support that. They have essentially the same set of problems we talked about here -- monster backlog, lots of political pressure, trouble with, you know, the difficulties of examining, not enough time. You talk to the examiners. They talk about exactly the same sorts of problems the examiners are having. An invalidation rate in litigation that looks incredibly similar, if not worse, than here, you know, around 50%. So, in that sense, it's hard to see how we should -- we

should not expect, at least in my view, that the PTO is going to provide any sort of help for a high-volume, low-quality patenting strategy. These incentives are simply too large. There are certainly lots of things you could do at the PTO to make the trains run better and may not be very harmful. I mean, you may actually get some benefit to society from doing them. But I don't think you're going to get any actual gains in terms of patenting. So, what can you do? Well, you could reduce low-value of patents by simply, you know, changing the cost structure, shifting a lot more cost to patentees, making it much, much, much more expensive to patent. That would certainly help. That has a number of obviously, unfortunate effect as well, which is it creates distributional problems with who can patent. And, you know, perhaps we can do some of this, but I would be -- very cautious about doing so because that has, obviously, a number of distributional problems with small companies. You could reduce information costs. I think this is where the big gains are, is work on notice function. You know, I have written a lot on claim construction. I think that's fundamental to the patent system. The fact that we cannot figure out claim construction is deeply harmful to the patent system. I don't agree with mark that it's completely broken. I think we actually had rules that were going in the right direction but we've taken steps back in recent years. And then taking some -- there are disclosure requirements more seriously than we do. You can reduce the cost of portfolios once they're out there. You can take in more permissive approach to mass licensing, but of course this has competitive effects, potentially important competitive effects, so we should consider that, as well. And, you know, there's a series of more radical approaches. You could treat patents as a form of pollution and have a cap and trade system, where you limit the amount of patents that people can get per year and let them trade permits to get them. And that's, you know, not a particularly serious suggestion, but I'm thinking that that -- those are the sorts of order of magnitude of solutions that we need to think of if you really want to change the system from the current sort of high-volume, low-quality strategy to something else. And so, this is just sort of the end. The whole is greater than the sum of the parts as patents, and we need to understand the patent system in that light and not in the traditional light of each individual patent matters as its right to exclude. So, thank you very much. Happy to hear comments.

>> Erica Myers: Thank you to all our panelists. That was really super and covered a lot of in-depth information. So, what we'll try to do in the discussion period is partly to get your reactions to each other. You all did a great job of presenting different information. And so, it would be good to hear

your responses. I wanted to start with some of the issues that Stuart brought up, talking about technology transfer from entrepreneurs and start-ups into -- into larger companies. What's your sense of how frequently start-ups and entrepreneurs hope to commercialize their inventions themselves as opposed to transfer that information -- transfer that technology to another company in the hopes that the other company will actually get it to market? I think what I'm getting at here is, how important for entrepreneurs are these markets for technology? Anybody.

>> Male Speaker: My sense -- Stu may have evidence that more directly assesses that question. He talked a little bit about sort of you know 5% number. My sense is that almost always start-up goes into a business, goes into business because they want to make a product, because they want to make a -- people -- you know, there are companies now who go into the business of, you know, collecting patents, and I guess that's a somewhat different exception to consider. But nobody who develops a new technology develops a new technology thinking, boy, I really hope not to practice the invention but to ultimately get patents and sue other people who do practice the invention.

>> Male Speaker: Yeah. Although you know, maybe in the semiconductor industry, I mean, I think one of way of looking that, right, is that there are design firms that start up all the time, there a specific -- you know, they have no intention of ever building anything at all. They're just there to design. Right?

>> Male Speaker: That's right. That's right. So, the question of what do we mean by practicing the invention I think requires some industry specific attention, right. Because we can certainly have and patents can certainly encourage vertical integration. I can make a piece of the puzzle and then kind of put that into the downstream market, particularly in semiconductors where it's an industry that requires substantial investment to produce the end product.

>> Erica Myers: And also, if anyone would like to speak, you can turn up your table tents and you know, also feel free to contribute. I don't mean to stifle the discussion here. You talked a little bit about the varying by industry. Well, for instance, in the biotech industry, it's a common model to develop your technology and then hope to get purchased by a big pharma company, not really any

necessarily a thought from early on of getting that drug to market yourself. Does that model also take place in the I.T. industry? And Stuart, and any other comments.

>> Stuart Graham: Well, I did want to say that -- let me just chime in on something that mark said before, and that is, you know, I think it's a -- you know, it's a plausible hypothesis, what you've set up. Hopefully we'll be able to answer some of those questions in the data. You know, I've been -- I'm just obviously churning out for you now, you know, the most -- you know, the most grossest statistics. But obviously, with the age of the firm, we'll be able to see if these -- you know, in more narrow sectors, we're going to be able to see if firms are actually developing more of a licensing strategy over time. I will say also, you know, chiming in and dovetailing on what Polk said, I think that, you know -- you know, this is a -- you know, particularly in complex technologies, right, where you have a lot of opportunity for vertical specialization in markets, it -- you know, it seems that this is just a, you know, more substantial opportunity for firms. Having said that, though, on to the second question, you know, what -- you know, how does it play itself out in terms of acquisition as a strategy? I'm actually working with graduate student now, and what we're trying to do is model and then bring empirical evidence to bear on whether there are differences in the way in which patent portfolios are built given the incentives or given the intention of the firms in terms of how they see their exit event. And, you know, I've asked some people about this out in the field and they say, "oh, there are certainly differences in the way in which patent portfolios are built," and then I ask other people, and they say "absolutely not, you build for value and that's what you do." So, hopefully we'll be able to say something in the coming months.

>> Erica Myers: Iain?

>> Iain Cockburn: Actually, I think this phenomenon of hoping to be a quiet or pure licensing model is, you know, most visible in sectors like biotech, pharma, but I think it's actually quite prevalent elsewhere. The actual incidents, I think, nobody really knows until you know, Stu gets back to us. But I would offer the observation that, you know, for example during the 1990s, the only really good way to make money in Silicon Valley was to get acquired by Microsoft. That's obviously, you know, a gross simplification. But I think the point to be learned from this is that, you know, the vertical market structure of industries really matters here. You know, the problem in

bio-pharma is that between small biotechs and the end users, you know, stand large companies who effectively control manufacturing, distribution, and marketing. The pathway to get to market it is long requires, you know, capabilities these small companies don't have. Often overlooked in this discussion, however, is the -- you know, potential sort of inefficiency arising from a market for technology which is, you know, consider the large pharma's problem. Increasingly -- and the numbers show this very dramatically -- increasingly, they rely on sourcing technology from upstream, either through acquisitions or through partnerships or licensing deals and so forth. The efficiency benefit we ought to get there is from specialization. But from a large pharma's perspective, you know, they can't abandon doing basically research and the like in molecular biology and hope to rely simply upon acquiring it from upstream, otherwise, they're extremely vulnerable to holdup from upstream. So, you know, there's a cost to opening up this market for technology in that the big pharmas still have to continue investing in basic research in order to have a credible alternative to go elsewhere in the event that they don't like the prices that they're facing from upstream.

>> Erica Myers: Does it make sense to think about a distinction between a market for technology that involves this kind of transfer being acquired, licensing, to a manufacturing company, versus a market that's about clearing patent rights? Manufacturing company independently creates the product, gets it out there, but needs to clear the rights. Mark?

>> Mark Lemley: Well, I mean, I think it makes enormous difference at a -- at a sort of economic level. The question is whether you can operationalize a legal definition that treats those two differently, right? So, I agree. I think we could actually solve a significant number of the problems around the litigation of use holdup issue if we had a way of distinguishing between licenses and/or litigations that were at their heart about technology transfer. That is, where information is actually passing from one to another. And licenses that were not, right? You know, may be involved in independent invention in Sam's formulation. The problem is, once you create a rule that starts to distinguish between those two, every license agreement will give you technology transfer whether you want that technology transfer or not, whether it's helpful to you or not. So, I mean, I think it's - I think in terms of thinking conceptually about the industries, I don't -- I think the number of people who go into the business to become patent asserters or patent license revenue collectors is

relatively small. But there are a significant number of people who go into the business as Stu and Iain and Polk suggest, to engage in technology transfer, sell out, the know-how, maybe go in-house, be bought up by work for a new company that will manufacture the product and so forth.

>> Erica Myers: In thinking about technology transfer, what's the effect of the ambiguity and the uncertainty surrounding the patent system, and, as opposed to all of the other uncertainty, you know, for instance, associated with the technology, is the patent system really the problem in that kind of technology market where we're transferring, you know -- an actual technology to be developed by a manufacturing company? And what should we do with the patent system to deal with those issues? Polk?

>> Polk Wagner: Right. Well, I think as Iain suggested in his presentation, there are just inherent and sort of maybe intractable problems with trying to value information at all. And so, talking about sort of an efficient market and knowledge transfer is difficult to do, even in a best-case scenario, because you have all of these levels of uncertainty that you were just discussing. I do think that that patent system, the lack of certainty surrounding the patent system is not helpful. And as I think Stu had a slide showing, you know, how it just eats away, it would otherwise be the welfare game. One of the things we think patents do or should do for us is provide the people the ability to transact around knowledge assets that would otherwise not be possible. And if you don't have enough, every bit of uncertainty that develops, you know, undermines that potential gain and to a significant extent. So, from that perspective, I certainly think that the lack of certainty and the patent law is very significant and should worry -- worry all of us.

>> Erica Myers: Iain?

>> Iain Cockburn: Yeah. I agree. I think that, you know, the lack of clear title, whatever analogy you would draw to, you know, real property, you know, is certainly costly and distracting. I do wonder, though, you know, how serious this problem is in relation to other sources of risk and uncertainty in the market for technology. You know, it strikes me that the conversation today has largely steered away from, you know, recognizing, you know, a very critical factor of most of these transactions which is their prospective deals about something that might happen in the future. And,

you know, an economist looking and trying to value a license agreement is going to be critically looking -- you know, when I look at them, I understand them as ways to share risk between the license or the licensee. You know, many of them, as we know, are complex documents, a lot of contingent payments. And there's a royalty on net sales of something, which is not yet produced or even defined. And my sense is that that's the first order source of risk and uncertainty that participants in this market are dealing with, and that the title problem, if you like, is secondary.

>> Erica Myers: Since we are talking about the patent system, any thoughts -- Mark, you said we can't solve the uncertainty problem, but what can we do to make it better? And any other comment you were going to throw out there.

>> Mark Lemley: Well, the comment I was going to throw out was I that, I think this problem is industry specific.

>> Erica Myers: Okay.

>> Mark Lemley: Right? And I mean, it varies widely -- you know, the software industry, you go ask venture capitalists, wave to everyone -- there we go. That, you know, software industry, venture capitalists might care their start-ups have patents. They probably care -- they probably don't know and almost certainly don't care whether those patents are valid, what the claim construction is going to end up being and that sort of thing. By contrast, in the pharmaceutical industry, pharmaceutical companies will not enter into new drug investigations unless they're confident up front that they have a patent portfolio that will cover those drugs. What can we do about certainty? You know, look, I think there are -- I think there are a number of things you can do to try to gather better information, either cheaper or earlier than we do it in the current system. Bhaven Sampat and Doug Lichtman and I have proposed that we ought to try to harness information in the hands of the patent applicant by sorting applications into those who are willing to pay for extra scrutiny to get a stronger patent and those that are not. I think a post grant opposition system gathers information in the hands of competitors about which patents are important and which ones are not and uses it to make earlier and somewhat cheaper decisions on the validity of that patent than we would get in court. It may be that in certain industries, we can

use something like the peer to patent, peer review project to try to scrutinize applications effectively at no cost to the patent office. So, I mean, I think there are lots of things you can do, and then I think there are specific ways we could get greater certainty in the damages rules than we have right now, for example. But I think the toughest one-and-one that I just don't see a clear way to solve in most industries is the meaning of the patent, the peripheral claiming system that tries to define the boundaries of what the patent's going to cover, including technology that doesn't yet exist in many cases, just doesn't work outside of a few industries like pharmaceuticals and DNA, where we have a clear nomenclature that everyone understands the meaning of.

>> Erica Myers: Stuart?

>> Stuart Graham: Yeah. I'll chime in on a couple things that Professor Lemley said. Again, running back to our survey, he's right, you know, there are significant differences in the way in which the firms from these two industries, I.T. versus biotechnology, are telling us that venture capital cares about whether the firm has patents or not. A technology firm is much more likely to tell us that their investors care. The other thing we find is that the biotech firms are paying significantly more for their patents, which suggests either they're more complex or that they're just taking a lot more care in the type of things that they're buying from -- you know, from the patent office or their intermediaries. I mean, on this -- on this question of inefficiencies in the system, you know, I go back to a professor of mine, David Tease, and Tease had taught me originally that, you know, there are a lot of substantial problems associated with transaction over intangibles. Right? The opportunities are hard to -- are much harder to recognize. It's much harder to find parties for the transaction. Disclosure itself over intangibles is very difficult. You know, oftentimes wrapped up with tacit knowledge, that's difficult to codify and to -- and knowledge about which it's difficult to transfer. And the boundaries -- you know, the boundaries that we've been talking about. You know, I still -- you know, I'll swing back again to the prospect that looks, I guess, over the last couple weeks improved of actually getting a post grant opposition system. Again, on the narrow -- on the narrow ground of being able to increase certainty over the validity and boundaries of these things reasonably early in the process. And this as the added -- the added feature of also offering some quick -- some reasonably quick feedback to the patent examiners. They're getting feedback

within a year as to the validity of their work product that seemingly could only help in that quality process, as well.

>> Erica Myers: Does your comment suggest that start-ups should actually want post grants in the sense that if they survive, they've got something better? And do you know if that is something they want?

>> Male Speaker: I've actually -- I've spoken to a lot of folks at small firms. I hear -- I hear differently. I mean, some are fearful of being -- you know, of being opposed to death. But others with whom I speak actually believe -- and particularly those that have an experience in the European system, where they actually were involved in that system. Even though they're at small firms, they believe, and have told me so, that -- that more certainty in the system can only help them.

>> Erica Myers: Okay. Polk?

>> Polk Wagner: So, I wanted to just quickly respond to Mark, which is I think we can solve the claim construction -- .

>> Erica Myers: Get better. "Solve" sounds -- .

>> Polk Wagner: Yes. "Solve" is, yeah, probably too strong. We can certainly get further along the line. And I think that, you know, the key is essentially what he said, which is in areas where we have a fairly well understood set of nomenclature, then it works, and it works reasonably well. Is it 100% predictable? No, of course not. It never will be. But I think if we actually were serious about claim construction rules that forced patentees to define what they meant by their claim terms in a way that people could actually understand what they meant, then you're going to get a lot better patenting. The problem we've had is that for the last 20 years, the federal circuit has tried different things with respect to claim construction methodologies, the PTO has never been on board with claim construction methodologies at all, and in fact, took the position in the Phillips case that they don't even do claim construction. Which, think about that for a minute and whether that makes any

sense. So, you know, in that environment, no. We're not even close to getting the way we should get in claim construction. But I think we'd be deeply remiss in giving up on it, because I think that is the one area that we can really make significant gains, in terms of the notice function of patents.

>> Erica Myers: How might you to do that? How might you force patentees to say what they mean?

>> Polk Wagner: Well, you can do a variety of things. You can have the PTO take claim construction take it seriously, for one thing, either by forcing patentees to be quite clear about what it is that they mean. You can force patentees to provide a glossary of any important words in their patent. And many patentees already do that, but, sadly, not enough. In fact, the incentives are generally the other way. You can -- you know, I thought that the federal circuit's three or four-year attempt to go towards a dictionary meaning, which had a number of problems in the transition period when patents were not, in fact, drafted in that light, if it was kept over the long term, would, in fact, result in greater certainty because people would draft their patents according to known definitions and we would then get an expected result at the other end. It doesn't work at all and has serious transitional problems, of course, which was what we were seeing and why I think they abandoned it. But I think there's a variety of specific tactics you could use to increase, the, at least - - decrease the scope of uncertainty with respect to claim construction.

>> Erica Myers: Is your suggestion of having the PTO do claim construction enforcing patentees to be clear, are you thinking about stronger enforcement of the indefiniteness requirement in 112?

>> Polk Wagner: So that's certainly one way, right? You could use -- we could be serious about the indefiniteness requirement, particularly at the PTO where they don't, in fact, take it particularly seriously, in my view, and require patentees that don't provide a sufficient level of detail with respect to what it is they mean, that they have to either, you know, define something very clearly in their specification or at minimum tell the patent office during prosecution that that's what they mean. You could do a variety of other things. You know, academics have proposed things like, you know, a standard set of dictionaries for particular technological areas that are then widely accepted as -- or sort of that default presumption is that you get those meanings. You can

obviously vary it if you have any reason to, but it's forcing the patentees to either accept the default meaning or say something that would indicate to the public that they're not using the default meaning, instead of what they do now, which is be as vague as possible, avoid any expression of meaning with the hope that when they get to litigation they can, you know, broaden the meaning beyond what the patent office assumed it was.

>> Erica Myers: Sam?

>> Samson Vermont: Yeah. So, the definiteness requirement, being strict about that, is the no-brainer. Right? That's something we really ought to do. So, there's some -- a little -- I guess it's older case law, but some federal district case law saying that a claim will not be held invalid for indefiniteness unless it's insolubly ambiguous, and then goes on to talk about even though reasonable people could spend a lot of time looking at it, and if they end up disagreeing that's not insoluble. Right? And then there's a later case where -- a 2005 case where the federal circuit says only if it's a severe defect. And there are some other cases that don't use language that's so forgiving, but all of that -- but even in those cases, I think the standard isn't high enough. It seems that the standard should be what the statute says for starters, which is that the claims should clear -- particularly and distinctly claim the invention that the applicant regards their invention. So, we think particular and distinct should be the standard and also what the applicant regards as the invention may be a separate component. It may be an additional thing. And the CCPA recognized it as such, but I'm not aware of any recent cases. So, we may get some mileage out of that. We can also consider the possibility of changing the presumption of validity with respect to definiteness. So, if the courts aren't willing to drop the clear and convincing burden with respect to all aspects of validity, perhaps we can just target definiteness and say with respect to definiteness, the standard is preponderance of the evidence. The Lexicographer rule is somewhat problematic. So under this rule, applicants can define things as they wish, and they don't have to explicitly do so. They can just do so implicitly, by the way that they write their specification. Perhaps the rule -- we should modify that rule so that it's still available, but only when standard terminology is not readily available to the inventor and that the standard technology would not suffice to describe the invention. And then additionally, if you have to use special language, right, if you have to adopt

idiosyncratic meaning for something, then you have to say so explicitly somewhere in your specification.

>> Erica Myers: Iain?

>> Iain Cockburn: Yeah. I think it's worth reflecting here on, you know, where markets -- where markets function effectively and what kinds of property rights are well priced and, you know, traded in high volume and liquid and where we see, you know, an ounce of gold, a barrel of oil, a bushel of wheat, you know, 100 shares in IBM. I mean, these are well-defined -- you know, the treasury bond futures contract, these are very -- you know, we start with precision in definition, and from that, the rest of the market seems to follow. And I think the -- I was struck listening to Jim Malackowski this morning. You know, at least -- even before I was working on my doctoral thesis, economists were trying to come up with ways to value -- value patents and intangibles -- and others went at this for a long time. And, you know, notwithstanding much improvement, the volume of data that's available and the statistical math that's in all the rest of it, we're still stuck pretty much where I think where Ocean Tomo or any other participant in these markets is stuck where the things you can see about a patent and, you know, methodologies for valuing patents and so forth, you know, these very blunt instruments. We count citations. We count the number of claims. I mean, I've struggled for 25 years to think of any way of doing a meaningful study in which you could measure the scope of a patent except by, you know, paying \$25,000 per patent to a trained attorney to come up with some, you know, customized map. And I think that's -- you know, there's a very fundamental problem. We want to have these objects, you know, traded frequently in liquid markets. The lack of standardization is very -- is very, very profound.

>> Erica Myers: Any reactions to the PTO proposals or to other ideas to place more burden on patent applicants to bring more information into the patent office, into the prosecution process, describing what's in that prior art and why the invention is different? Would that help better define patents? Mark?

>> Mark Lemley: It might help better define patents. It might help weed out bad patents. But of course, it's going to do so at a cost. And the question to me is whether the cost is worth paying.

And that's a complex question. The answer is clearly sometimes, yes, the cost is worth paying. If we could distinguish between applications that turn out to be important and applications that are unlikely to turn out to be important, that would help. And so, I've got some proposals for doing that sort of thing. But the other -- then the other factors that go into the complexity are, is this search going to be done anyway? Have you filed your application in a foreign jurisdiction, for example, which is going to -- can you engage in work sharing to do the search? And how is the quality of the search going to differ from the applicant's search compared to the examiner's search? Bhavan Sampat and I have done some work suggesting really rather substantial variation by examiners in the quality of the searching that they do, based in significant part on how long they've been at the patent office, not perhaps in the way you would think. The longer they've been at the patent office, the less searching they do, the less prior they find. But then there are also -- you know, there are psychological effects, right? Is an examiner going to be more likely to understand and/or pay attention to art they find themselves, rather than art that someone -- had been handed to them from the outside? And so, I mean, I think the answer is we need -- you know, we ought to have a reasonable search at a reasonable cost. We ought to get the applicants to do that, only if we think that they are better positioned to give us that information than the examiners are. They might, in fact, be. But I'm not totally persuaded about it.

>> Erica Myers: What about beyond the search requiring patent applicants to say more about the prior art that they have found?

>> Male Speaker: Right. So, the PTO rules that were upheld -- by the federal circuit quite recently require this for large applications, basically. I mean, I think it's a good idea. But I think it does raise substantial red flags for the patent applicant because of the possibility that that information can be used against them in a court of law. And so, I think we need to sort of pair that idea with some sensitivity on the part of the courts in equitable conduct cases that sort of, you know, compelled statements not be the basis for an equitable conduct unless it really does look like they were deliberately false. My guess is the federal circuit is getting that message and will move in that direction. But, you know, that's a question that's -- you know, we have to wait and see to some extent.

>> Erica Myers: Stuart?

>> Stuart Graham: There already are requirements -- requirements that aren't working, and that suggests to us that, you know, the patent applicants are rational. So, we -- and we can expect that -- I mean, Mark and others, you know, have told us that, you know, the patents are probabilistic. Well, it's also true that, you know, the likelihood of getting caught for inadequate disclosure might be probabilistic as well. Now, maybe that'll work to our advantage, by shifting those responsibilities over to the applicant, because the applicant will be more likely to do adequate searching under the new requirements when they know they have a valuable property that's worth doing something with. But I'm not -- I'm not convinced that it overall is going to -- it's going to, you know, correct the problem.

>> Erica Myers: Okay. Mark raised the idea of transparency. And I'd be interested to hear the others' responses to that. Would it be helpful to increase the transparency in the market for starters, Iain?

>> Iain Cockburn: You know, I think Mark may be the strong form case for more -- much of the information about transactions in IP being made public. You know, this morning -- this morning I got distinctly the other impression from practitioners that they are very anxious that disclosure is somehow profoundly damaging. Now, that may be the case. I think we just don't know. I don't think I would go as far as Mark. You know, I'm wholeheartedly in favor of more transparency. I'm not quite sure that complete transparency is the answer. There are a couple of subtleties to this, which I think are worth thinking about, one of which is, you know, my competitive disadvantage from, you know, disclosing information to my competitors is also my competitive advantage from reviewing their disclosure. You know, we've seen, you know, sort of -- you know, economists would point to, "what's the equilibrium outcome under different laws?" I think you very frequently hear from people, who are -- practitioners are concerned about the immediate private interest of their enterprise or their client. They see a small -- private disadvantage to disclosure. And that's enough to stop them from doing it. Collectively, they need to disclose information. You know, it can be socially very costly. You know, and an example of this, I think, is very clear in biomedical research. One of the world's greatest repositories of clinical knowledge is in the basement of the

FDA, and nobody can -- nobody can access or get at it because there's a conviction on the part of particularly the legal people in the pharmaceutical industry that somehow letting your competitors know about your dry holes or failed projects or difficulties that were enough to stop a project, you know, would be damaging. And it might well be damaging, but I've been to a number of meetings where, you know, provided there are no suits in the room -- so, if you have the scientists, they can all agree that the progress of science will be greatly speeded up if only there was broader access to this kind of knowledge. The moment you bring a lawyer or business person in the room, you know, it all stops. And I think that, you know, there we can see very clearly that failing to disclose all kinds of information which individually is presumably might be costly to the enterprise is enough to stop them from doing it. And I think that we just don't really have any evidence either way looking at these markets for IP where the requirements to disclose -- as was pointed out, I think that, especially at the small enterprise end of the spectrum, they are required to disclose if they want to go anywhere near the FTC, because any agreement they write is material and they've got to, you know -- got to disclose and you can go and find it on the FCC website. That requirement doesn't seem to have had -- you know, had a detrimental effect on investment or progress of the biotechnology sector. They all have to -- all their agreements or most of their agreements, you know, become public. But I think this is an area where finding a way to collect meaningful data about the actual costs of disclosure, as opposed to the deep-seated fear of in-house counsel about owning up to anything, I think it would really make a difference.

>> Erica Myers: Polk?

>> Polk Wagner: So I mean, one question just to dovetail off where Iain was, it's not entirely clear, and one other dimension of this, it seems quite likely, we don't need to have every bit of information out there in order to make these secondary markets work a lot better than they do now. We just need enough information for people to make reasonable decisions on a variety of levels. And that may be something far, far less than requiring every single transaction that occurs around a patent to be disclosed, although as sort of researchers, we love to say we want all of the data that's possible. You know, marks function all the time with incomplete data. And so, you know, one of the things that I thought was rather compelling that we heard this morning was, you know, the private market might provide a lot of this. We're getting some disclosure through the FCC process.

We're getting some disclosure through auctions. We're getting some disclosure through if the sorts of stock markets for patents actually occur. We're going to get some disclosure that way. And one thing to think about is whether we should wait and see, if we don't get the quantity of disclosure we need, just through private activities rather than trying to mandate something. The problem with mandating something, as always, is whether you get gaming the system, whether you get people telling you things that aren't true, whether you get people restructuring transactions as so to avoid it looking like a patent transaction in order to keep it out of the disclosure requirement. So those are the things that would sort of concern me about trying to mandate it broadly.

>> Erica Myers: Okay, Iain?

>> Iain Cockburn: Yeah, I just don't want to hog the microphone here. But I had another thought I wanted to put on the table here, which is, you know, the well-functioning markets that we can point to immediately, you know, tend to be ones where there is a lot of mandated disclosure. And if there's not mandated disclosure, there's a great deal of public energy and resources put into collecting and publishing data. So, I think, you know, one of the big policy problems -- you know, many of the problems of thinking about policy in this area rise from things built into the system, which I believe were grounds for despair, like the relative amount of money spent on collecting or publishing data on pork bellies versus something we might actually care about, such as, you know, transactions and intellectual property. And I think, you know, we don't have a government bureaucracy -- government statistical system which, you know, can or will collect or publish this data. I mean, it really is, I think, kind of shocking and shameful, that almost the only place you can go to find any of the information about the size of the market is, you know, the IRS statistics of income. There's one or two tables statistical published by the entire U.S. government which are of any help in this regard. And, you know, one thing you might think the PTO or some other government agency involved in this activity might have as part of its mission is to, you know, produce information which, you know, respects the commercial interests of the people who are affected by it, but nonetheless make public something about the volume of trade, where it's occurring, what type of technology, what the prices might be.

>> Erica Myers: And why -- why would that kind of information be useful to the market? I'm sure it will be useful to academics.

>> Iain Cockburn: Oh, I think it --

>> Erica Myers: Yeah?

>> Iain Cockburn: No. I think -- we don't know. What is the size of the licensing economy in the United States? I mean, people will throw around all kinds of numbers. It's not clear where they come from. There's that problem, specifically in terms of participants, you know, in the marketplace. You know, I think a lot of -- you know, useful information provided this morning and a great deal of common sense talked about, you know, how do you shape the expectations of participants coming to transaction and all the failed transactions I was talking about earlier? You know, people don't seem to have the ability or willingness to think about, you know, formal economic modeling or valuation, which is based upon data and number crunching. Part of that is because the available data is incomplete or too costly to find or we don't know where it is. And I think many of these negotiations fail because the two parties are streets apart, and if they don't have an informed intermediary or a broker in the middle who is informed, you know, I think it's one of the main deals where -- main reasons why these deals don't take place.

>> Erica Myers: Stuart?

>> Stuart Graham: Yeah. I wanted to say, I mean, in some sense we have to ask ourselves what information are we after here? Are these -- you know, do we want information on sort of one-off patent transfers? Oftentimes, patents are transacted with, you know, many other different types of assets in ways that are complements. There are patents to complement one another, and together they're worth more than, you know, than they are individually. You know, they are offered with other complementary assets in some sort of transaction. So, how do you dissect the value of a patent from those other complementary assets that are -- you know, that are being transacted over? You know, the problem that Iain points to, this problem of sort of not having enough study in this area, it just reminded me of a conference that both Polk and I were speaking in at Berkeley, put on

by the Berkeley Center for Law and Technology on patent valuation. And what -- two things were clear. One thing was although they really tried to get the people that were best able to say something about empirical evidence, about, you know, the prices of what's going on out there, there's almost nothing. All right? There is almost nothing. And I -- I had gotten up, and as part of my presentation, I offered some evidence that was collected in Europe from some colleagues of all of ours on inventor surveys. A lot of problems associated with inventor surveys. And there was, you know -- there was a large amount of criticism as to using inventors as a source of information on what the value of these things are. But no one was able to come up with a better way to collect information, and certainly no one was there who's been actively involved in these transactions, that was willing to either validate or underline with real numbers whether any of the information that was presented was reasonably near the mark or off the mark.

>> Erica Myers: Does anyone have any thoughts of something -- the government collecting in, you know in aggregate, genericize, respect confidentiality, on data doing something less than collecting every licensing agreement, which sounds like a monumental task? Is there something that could be useful and yet not go that far? Iain, any thoughts?

>> Iain Cockburn: Well, the tempting but surely -- surely dangerous analogy is to think about real property. One of the -- you know, real estate markets seem to function pretty well most of the time. They have a public land registry. Every transaction is posted and priced. And over here, we have very heterogeneous objects and so forth. I mean, I don't know that the -- what would be the burden? You know, you've been giving a public grant of a piece of property by the patent office. You know, all kinds of obligations go with that. The obligation for the patent owner to post back in confidence to the patent office or to the IRS or somebody, you know, the nature of the payments associated with that piece of intellectual property, you know, in my view probably aren't that burdensome. Nor would there be a particularly large burden on whichever government agency is charged with doing this, to do something like just aggregate them up to the level of patent classes, you know, for the last quarter and just report. You know, we report employment numbers. We report pork bellies. We report all sorts of things. You know, knowing what the aggregate value of the mean price or something -- something like that, you know, at some reasonably fine grain but

not so fine grained as to really damage the interest of the patent holder, I don't see how that would be difficult or that costly.

>> Erica Myers: All right. Any other comments on that topic? All right. Let's talk about the independent invention defense. And is this a concept that applies more for the -- of the other markets I talked about, the market for clearing patent rights, transferring patents just for the purpose of getting -- acquiring freedom to operate? This is obviously not a defense where it's going to be so applicable at all, when you have the biotechnology company transferring, right, to the bigger pharma company. So in thinking about that market for patent rights for the purposes of freedom to operate, what sort of inefficiencies do we experience there? Why might we need the independent invention defense? I want to think a little bit about how that market operates. Any thoughts about -- is it facing the same problems in the sense of ambiguous patent rights and failure of notice? Stuart?

>> Stuart Graham: Yes. And I'll make this short. I'm not going to -- I'm not going to comment on that per se, but what I will do is add -- add some gloss to the question of freedom to operate. And, you know, time and time again, when I was interviewing venture capitalists associated with this survey that we're doing, because we did a lot of careful background where we set up the survey. They were telling me time and time again that the most important reason why they wanted their -- the firms in which they were investing, the portfolio companies that have patents, was to insure that they had freedom to operate, room to operate on the theory that they said they were investing in people. Yes, sometimes they were investing in technology, but actually, from what I heard, that wasn't -- that wasn't par for the course. Generally, they were investing in people and an idea and a direction and they knew that these people would have to have room to innovate towards the market. And that's the role, at least in the lines of those that I spoke with, that patents were playing when they wanted those to happen. So, in this idea of having the freedom to operate, particularly for these young entrepreneurial technology -- technology entrepreneurs is one. And so it's --

>> Erica Myers: All right. So, in that sense, is that patenting so that someone else doesn't or patenting for a defensive reason?

>> Stuart Graham: Well, again, the way in which that role for patents plays with the idea of an independent inventor defense is --

>> Erica Myers: Okay. Iain?

>> Iain Cockburn: I've actually heard different things from PCs, and also I think there's some, you know, work being done on this by, you know -- for example. You know, one thing -- maybe venture capitalists don't understand that a patent is not an affirmative right. I actually think that's -- that's not the case. They're not -- getting a patent issued, of course, doesn't give the enterprise, you know, some -- necessarily some clear space to operate. And what the -- what some of the studies that have been done seem to suggest, and what I've heard from PC is that, you know, fighting for a patent demonstrates something, there's a certain amount of validation of the technology, that at least they got over the hurdle of the overworked and under informed patent examiner. But more often they're looking to -- there's a signal that while the -- you know, the principals in this company know how to play the game and it's a signal of the maturity or the sophistication of the enterprise as much as anything else in some circumstances. To this -- I think that, you know, much of this problem is all the same problem, whether we're talking about, you know, uncertainty surrounding patent rights or anything else, which is my two-word or three-word summary of it is, is that I call it the "no med line problem." That is to say, many technologies have this difficulty that are not codified, searchable, or well defined from the perspective of anybody in system, whether it be the applicant producing prior art. They're not quite sure what might be relevant to their invention. The examiner is not quite sure either, nor would be another party to a transaction. The single exception to this -- I think that holds in mechanical, electrical, you know, business methods, software, all kinds of technology domains. Nobody's quite sure what it is. The big contrast is biotech, biomedical or chemical arts where, you know, there's no ambiguity about what a molecule is. There's a very well defined -- and anybody in ten minutes, I exaggerate, but very quickly can go to the technology that's exhaustively indicated, has a very standardized vocabulary, it's very easily searchable. And that clarifies the rights -- the nature of the rights for everybody and removes a lot of that uncertainty.

>> Erica Myers: Does that suggest that as the I.T. industry, or the software industries develop and standardize their own nomenclature just as a matter of engineering, that that could help? Polk?

>> Polk Wagner: Sure. I mean, I think I would -- I would definitely expect it as these industries mature, you're going to see a lot more. I mean, it's just sort of classic story, which is as it gets more worthwhile for these industries to have these sorts of systems in place, they're going to see them emerge because there are substantial gains that outweigh the costs of doing them, you know, and we need to remember that we are in, you know, I.T. and sort of business methods or a lot of these software areas. This is still a pretty immature industry in a lot of ways, particularly their experience with patents, because in many cases these industries were not active participants in the patent system until just the last decade or so. So, these were still quite young entrants to the patent system, and so we shouldn't expect them to be as sort of well ordered as some of the more mature chemical bio areas as they should be. So, I think there is reason to be hopeful that we can get our hands around that problem better. Never be perfect, but we can certainly do better.

>> Erica Myers: Sam?

>> Samson Vermont: Yes. I think we can expect some standardization of the nomenclature that it can get better, but it may never get close to being good enough. For molecules, the nomenclature is uniform and universal because there's only a certain number of elements, there's only a certain number of ways that bonds can form, there's only a certain number of structures. In the mechanical arts, we, of course, have a bunch of terms but not that many. Right? And maybe the software is along the lines of mechanical arts. There would be so many possible different things that you can make, there would be no point in naming them all, except really we just wouldn't -- people wouldn't know what those names are. It's not a guarantee.

>> Polk Wagner: But software people talk to each other in a fairly -- I mean, in a sense, software is communication with each other. I mean, this is what you do when you're communicating your machine. And so you're using a very standardized set of languages. So, I guess I agree with Sam that certainly there are reasons to understand why we see most of this development in bio and chem, because that's sort of the low-hanging fruit where there's a relatively finite set of

possibilities. But I don't think we should rule out that for software you can't get there, because that -- it's a very predictable area of technology that people understand. Yes, there's a huge range of applications, but the way that people talk about it is a very structured format. So, we should be able to do a lot better than we have, than we're doing.

>> Erica Myers: Stuart?

>> Stuart Graham: So, you know -- and we face the double whammy, because not only is the language imprecise, right? Even if it isn't, right? But also, marketable products in this space, right, have many more patentable inventions embodied in them. So, you get this, you know, both effects going on at the same time and that's -- you know, so, not only are you enjoying the specificity of language around biopharma, but there's one or at most a handful of products in an NDA or patents in an NDA. But maybe this will all be solved because as the nanotechnology people tell me, all technologies are converging. So, if that's the case, then, you know, we -- you know, we will all -- could all be saved in the long run.

>> Erica Myers: All right. This morning we talked a lot about the IP market, patent markets that involve auctions and brokers, defensive buying clubs, and all sorts of things, which seem to have less to do with developing new products and more to do with transferring the patent rights. Is that your sense of what those sorts of secondary patent markets are about? Do you have any opinions on whether those -- the operation of those secondary patent markets, what kind of effect that has on innovation? Or is this something that we want to -- is it -- are these efficient markets? Do we want them to be more efficient? Is that going to help innovation somehow? Polk?

>> Polk Wagner: So, I think the easy answer is we just don't really know, although I was struck by this morning's discussion in the sense that there was almost no discussion of how the secondary market influenced the decisions with regards to invention, innovation, patenting itself, because you would think that -- I mean, now with the fact that people have good information about what kind of houses or cars sell well is a huge factor in people's decision making about how -- what kind of cars to build, to create, to sell. And there was almost zero discussion about how this would feedback into that market, which I think that was in a way telling and maybe in a sense a little bit

disappointing, as well, because it then does then suggest that these are not -- either not thick enough to provide any meaningful information useful to make decisions upon, or the activities that are going on now are primarily based on trading rights around, rather than the actual innovative activities that we would hope that they would be doing. I mean, I think it's too early to tell, though, and draw any really significant conclusions.

>> Erica Myers: Stuart, did you have a comment? No. All right. Iain?

>> Iain Cockburn: Yeah. There are many things -- you know, many things go on when we think about the impact of these markets, you know, one of which is -- is, you know, if they could serve to you know, meaningfully simplify getting freedom to operate, you know, allow for some rearrangement of these rights, of existing rights over existing inventions into the hands of those best able to exploit them, all the things that we think that a market -- that more transactions, you know, would do, then I think it will be -- you know, clearly generates efficiencies. The question of the -- you know, the immediate impact on incentives to invent I think is really difficult to answer for all the reasons that we still find it, you know, very difficult to answer, whether or not stronger patents generate, you know, more invention. I mean, in the empirical evidence on this, you know, most people kind of believe that there is a connection but demonstrating it is surprisingly difficult. A lot of activities seem to go in which -- in where, you know, patents are an afterthought. I think that the -- it's just very difficult to determine this.

>> Erica Myers: If we make a distinction between inventions, coming up with the idea, reducing it to practice efficiently to get a patent on it -- and I'll define innovation for these purposes as taking that idea, doing all the development necessary to get a commercializable product -- how does that distinction help us think about how these secondary markets might be creating incentives to invent? It seems that if you're creating a market for a patent, you are perhaps creating an incentive to invent. Does that make sense to you?

>> Iain Cockburn: I think you're creating -- .

>> Polk Wagner: A tight correlation between patents and innovation. Which I think many patent lawyers would say is not necessarily the case. But --

>> Erica Myers: Okay.

>> Iain Cockburn: You're creating an incentive to create patents.

>> Erica Myers: Okay.

>> Polk Wagner: So that's clear. Now, whether that's actually the incentive you want to create is a different question.

>> Erica Myers: Okay. And so, then, the innovation, the additional stuff's needed to create a new product, any thoughts -- and the reason I'm bringing this is up is, Iain, you were using the word "invent" when you were talking, rather than "innovation," and I'm wondering if that wasn't intentional, and if you're making a distinction between invention and innovation, and the effects of these markets on innovation.

>> Iain Cockburn: Yeah, it was intentional. I think that the lamp post under which -- under which we look for our keys in most of these debates is the biopharmaceutical area where it's clear that, you know, well-defined patents are very -- absolutely essential for the innovation part of the process, you know, realizing that -- not just realizing that technology practices as a prototype but getting it into a saleable product. And without the patent it's very clear, I think, that the level of investment in R&D and, you know, the progress of the science and useful arts in that area would substantially slow down. Almost everywhere else in the economy, the other methods of appropriation, you know, seem to be the most important. And that's why we still struggle to find this link between -- between IP rights and incentives to invent, because everywhere else, people rely upon fast-cycle times, brands, manufacturing capacity, pre-emption of scarce assets, so on and so forth.

>> Erica Myers: Just right before we wrap up, I'd like to move to the independent invention defense idea, the idea that if a manufacturer of a product has independently come up with the idea with no knowledge of the patent, should that be a defense to infringement? Any thoughts on what that might do to the value of the patent, or whether it might lower the cost of getting those products to the market? Good idea, bad idea? Any thoughts on that? Sam, I was -- I was interested that you moved your --

>> Polk Wagner: Sam likes it.

>> Erica Myers: Sam likes it -- from a legislative idea to more fine-tuning the courts idea. Was that a practical reason for making that suggestion?

>> Samson Vermont: Yes. Well, two. Two reasons -- one is practical and that it just -- it doesn't seem that politically feasible --

>> Erica Myers: Okay.

>> Samson Vermont: At the moment. And secondly, I became more convinced that independent invention defense or taking the law -- taking it into account is a good idea. And, therefore, I became less worried about incorporating into, for example, the obviousness standard, which could result in full invalidation of the patent.

>> Erica Myers: Okay. Iain?

>> Iain Cockburn: It's a little easier to conflate this with prior user rights, but --

>> Erica Myers: Yes.

>> Iain Cockburn: You know, I think we do have an interesting data point in the, you know, one place where there is a prior user rate in the U.S. system, is business methods. Yet, we had this morning that JPMorgan are still paying out \$400 million or \$500 million a year. You know, if

that's the case, then it appears to be the issue of an independent invention defense or a prior user right. You know, it seems to be kind of irrelevant.

>> Polk Wagner: Yeah. I mean, I guess I would second that. Certainly our experience with the private -- the prior user right so far has not been in the -- to the degree that we thought that it might have an effect. On the other hand, a lot of what Sam was talking about is, in fact, a broader conception of not merely just -- at least as I understood that proposal is not merely a explicit defense, but more sort of taking account of a very sort of rapid follow-on invention that was not a copy throughout various parts of the patent system. And I think that is an interesting proposal. I mean, I would want to think about it carefully, in terms of the incentive at each step. But that, that, I think, is way of getting at some of the information that we want to -- that we want to understand the meaningful information that we get from the fact that somebody independently invented the same thing at essentially the same time without actually having knowledge of this other thing, of the actual patented invention. That's important information that strikes me that, you know, we probably want to take account of somewhere, whether it's -- I'm a little skeptical as to whether an explicit defense is either wise or ultimately going to make any difference, but it's -- possibly, we could use it elsewhere.

>> Erica Myers: Okay. Sam?

>> Samson Vermont: So, prior user defense may or may not be merited, but it's really not a close substitute for a reinvention defense or an independent invention defense. If the prior user is normally going to be the first inventor --

>> Erica Myers: Yes.

>> Samson Vermont: -- and so, under current law, if there's -- you know, if someone else invented first, then that party -- then the patent is probably invalid. If we gave prior user -- if we allowed prior user rights, then we'd essentially be just allowing trade secret holders to avoid the current law, which is that if someone reinvents later and they get the patent and prevent you from your use, so

prior user right is actually quite different. And because it only applies to things prior, it just encompasses a much smaller number of parties.

>> Erica Myers: Okay. Okay. We're about out of time. Polk, on portfolios, I thought I'd bring up one point. It seemed that a lot of the discussion we had earlier about creating more clear patents for notice reasons, were also a lot of the same thoughts that you had in your paper about encouraging' patentees to pursue higher quality patents rather than quantity patents. Does that seem correct to you?

>> Polk Wagner: Right. I mean, one of the ways I think about the reasons that people are getting portfolios and I think going for low quality, high volume, is just the information cost problem, is that they just cannot be certain about investing in any particular patent and, therefore, they don't. So, what they do instead is get as many patents as they can because that is the best balance between costs and benefits that the current system allows. If we move to a system where there was more certainty, better rights, maybe even if we moved to a system where there was a much more robust market for individualized patents, and, therefore, you could get a real value associated with a particular patent, then you might see less people going for the big portfolio and that would change the incentive effects, I would think, rather significantly towards getting more -- carefully doing more higher quality patents. I think some of the things that Stu has seen and others who have done research show that where patents -- individual patents matter a lot, so certain industries it matters a lot, certain kinds of companies, small start-up companies, they tend to matter a lot. There you see them getting fewer, spending more. The metrics of quality, although these are all sort of, you know, very blunt metrics of quality, are generally higher in those areas. So, I think that -- that's explainable on the grounds that they have a different kind of strategy than the big firms that are dominating the patent system right now.

>> Erica Myers: Stuart?

>> Stuart Graham: I was actually thinking about a specific example, as Polk was giving the presentation, and that was -- when I was in Vienna last year, I saw a presentation by one of the former chief economists at the EPO, Bruno -- and he had taken a look at Research In Motion's

portfolio, the European -- the EPO portfolio, prior to the end of the litigation and thereafter. And it follows your story. Prior -- well, it follows a story. Prior to the litigation events, they had few very high quality -- quality on all the measures that Iain had mentioned before that leaves -- you know, comparable scholars look at, citations, countries of designation, family, blah, blah, blah. And the patents that were coming out of the EPO after the event were much more numerous but much chunkier. Now, is this because they grew or because of this event? It looked like there was a significant break at that event that made it look like they were following a different strategy, at least in the EPO. And what I thought of was that, this was -- this was something I saw in early work that I did -- while I was still a graduate student. We were looking at patenting by the then-primary large package software firms, Microsoft, Adobe, Symantec, and had been looking at patenting over the long haul. And we noticed something that in the early 1990s, Borland was patenting per R&D dollar at an order of magnitude more than ten times what anybody else was doing. And it seems like this was a response to the, you know, the famous sort of Borland vs. Lotus litigation of a copyright. Having said that, though, I've never looked at the quality of those Borland patents, so were they doing a large number of very high quality patents or --

>> Polk Wagber: Given that their patent intensity was so high, it's unlikely that that was higher quality patents.

>> Stuart Graham: Yes.

>> Erica Myers: All right. Any last comments? And we'll wrap it up. Iain?

>> Iain Cockburn: You know, there are two "t" words not to bring up in any of these debates. One is troll and the other is thicket. And I think the one we haven't had time to talk about but in my view is a very important issue is, you know, how to transact into -- in the midst of a patent thicket. And you know, a thicket is understood as, you know, a large number of patents, you know -- a large number of rights potentially overlapping, held by numerous people, interwoven in a way which is very difficult. And I think that the -- when we think about these secondary markets working either for a -- you know, a nicely bundled up portfolio of patents or for a single patent, one of the things that's going to make it work is there's one clearly defined owner of one person to

transact with. The thicket problem is one of multiple owners, fragmented ownership, so work by Rosemary Sidonis, some that I've been doing with a colleague, Megan McGarvie on thickets and software, Mark Schenkerman, other people, I think there's a lot of new scholarship and interesting and provocative questions raised by the transactions costs associated with -- with thickets.

>> Erica Myers: What are you seeing?

>> Iain Cockburn: Well, one of the things we see is that, Megan and I have been working on entry and financing of start-up software ventures. You know, the data show to us that thicketed markets are ones which are very difficult to enter, where new enterprises -- it takes longer for them to raise money from outside investors, it affects their ability to get a liquidity event and IPO later. And most of these studies are pointing to these thicket problems, you know, understood as the difficulty in assembling, you know, the list of people you would have to go to, to -- if you wanted to license your way into a market, how many entities would have you have to go to, how would you collectively solve the problem of obtaining a license to all of their rights? You know, I think that's the narrowly defined context people have looked at it. Apparently, it does seem to be a significant problem.

>> Erica Myers: Have you looked at or seen or thought about the problem faced by a new entrant in that situation who does not have its own large patent portfolio? Is that a special problem?

>> Iain Cockburn: I don't know about large patent portfolio. The one thing that's really -- yeah, the thing which jumps out to us, I think, from these studies is at the entrance to arrive at a market with their own patent are significantly advantaged relative to those who don't. And that generates this sort of powerful dynamic, that where we -- you know, data shows us accelerating counts of patents in every -- no matter how grand you get, how finely defined the market is, it's exponential increase and that's driven by, you know, powerful incentives being incumbents to require patents. And if entrants can't get in without their own portfolio, you can see how this feedback effect is one of the things that drives this acceleration, and I think ultimately raises the costs for everybody.

>> Erica Myers: And then, oh, Stuart. Do you have a -- okay. And then, have you seen or thought about something I think we heard this morning, was that after this event happens, this feedback loop happens, you sometimes then see the companies selling off their patents into the secondary market again. And we have, again, another kind of feedback loop.

>> Iain Cockburn: I don't know there's any -- .

>> Polk Wagner: I don't know. I mean, you know, that's because the brokers were talking to --

>> Erica Myers: Yeah.

>> Polk Wagner: You know, so I'm not sure that how much we know about them. These markets, the secondary markets, are still extremely small compared to the number of patents that are obtained every year. So I'm not sure we can generalize sort of this swinging effect that was mentioned today. I mean, certainly there are going to be some players who, you know, once they've achieved certain technological goals then will bail out and sell their patents, and we certainly have examples here and there of companies that do that. On the other hand, there's an awful lot of companies that I think a ton of research shows are just getting as many as they possibly can, as quickly as they can.

>> Erica Myers: Okay. All right, all right.

>> Stuart Graham: I've sort of seen anecdotally that this -- this happens. You know, I've been looking through the patent reassignment data, which is notoriously just not good. So this is from the U.S. PTO. But every once in a while when I'm looking at pharma patents, I'll see just an entire chunk from a company, like, sold to L'Oreal or something, right? So over into the cosmetics -- some stream that didn't pan out, or whatever the case was, and just abandoned and sold out. So, you know -- something's happening. I don't know what.

>> Erica Myers: Well, one question. Why is the assignment data at the PTO not good?

>> Stuart Graham: Well, there's no requirement for -- .

>> Polk Wagner: Yeah, people don't -- don't file their assignments. I think they're technically supposed to. Right? I actually think they're -- I think they just don't. And there's no enforcement. I think the problem is, there's no actual enforcement. They are supposed to keep their assignment with the PTO up to date, but I think that the sense is that the vast majority of people just don't or forget or it's late or whatever.

>> Iain Cockburn: Doesn't work like the land register.

>> Erica Myers: Okay. And with that --

>> Iain Cockburn: Or the registry of motor vehicles.

>> Erica Myers: Thank you very much to our panelists. This has been very interesting and helpful discussion to us. We appreciate it. If anyone heard anything today they'd like to respond to, the FTC will leave open its comment period until May 15th. We're happy to comments which we will take into consideration as we launch into the next step of preparing a report when we conclude this. We will be in Berkeley with -- at the Berkeley Center for Law and Technology and the Competition Policy Center on May 4th and 5th. Thanks very much.