Craig R. Barrett; Chairman of the Board

Male Voice: Ladies and gentlemen, please welcome, Craig Barrett.

Craig Barrett: Well good morning, everyone. It's my pleasure to welcome you to IDF. It's good to be back and giving a presentation in front of this group. I started my career before most of you were born, a long time ago, and I've been around the industry for about 40 years now. And there are really two things that have intrigued me about this industry over the last 40 years. One is the great technological innovations that we've had. And I think it really from a semiconductor standpoint goes back to Gordon Moore's seminal paper in 1965 about Moore's Law which kind of traced the history of the integrated circuit industry all the way back to 1960 at that time. And Gordon projected that we could expect to see a doubling of performance over a period of time and integrated circuits and performance and memory density, that sort of stuff.

I don't think Gordon had any idea it would last into the 21st century, and our current projection is it will last another 15 years or so in the same sort of trend we've seen. But that tremendous innovation in the industry and then the innovation, not just with companies like Intel, but with all of you and bringing great products, really unimaginable products into the marketplace. It stimulated the world's economy. It stimulated education, scientific development. It stimulated everything we do, how we work, how we learn, how we play. So that's really kind of the embodiment of IDF, and the whole developer community is bringing that great technical innovation to market.

But the second area that I get really enthused about is the impact technology has on people, and not just the fact that we're going to show you great products here, and Pat and Dadi will come out today and talk about next-generation processors and computing, and then tomorrow we'll hear some stuff about mobility and consumer electronics and software development. The technical managers and the technical expertise of Intel are here and they'll tell you all about the great eye candy we have for you and the stuff that press will write about.

But the really intriguing thing as you travel around the world is you see the impact of technology on the other five billion people, when you get out of Western Europe and out of Japan and out of the United States. There are five-plus-billion other people out there that the technology has the ability to impact their daily lives and to lift them out of poverty and to give them better healthcare and better education.

So you good folks play not only a very important role in the advance and progress of technology, but you play an important role and can play an increasingly important role in advancing the well-being of people around the world with the use of technology. And that's what I want to talk to you about today.

I'll let the other Intel folks tell you about the next generation of this, the next generation of that. I want to show you some real-life examples of how we are collectively impacting the people around the world as we go forward.

I was at the first IDF over a decade ago in Palm Springs. We had a magnificent array of 200 people attend that, probably half of them press and half of them engineers. The affair has grown a little bit since then, I think with the increasing importance of our industry around the world. And we've seen some major milestones, not just over the last 10 years, but if you look over the last 50 years. The transistor is roughly 60 years old, integrated circuits are roughly 50 years old, microprocessors 37 this year, PC is 27 years old, the commercial Internet's about 20, Facebook and this great social software revolution we're seeing around us is three to four years old.

And the interesting thing is we continue to see this revolution of technology coming forward. If you look at it just from the computing standpoint -- and I was around when we worked with Sandia to create the first teraflop computer, that's 11 years ago. It took 10,000-plus Pentium Pro processors, 2,000 square feet, hundreds of kilowatts to make this thing work, but it was a teraflop computer.

Today, Intel and others can do that same sort of computational capability on a single chip -- teraflop compute capability, a trillion flops in one small piece of silicon. And who knows what it's going to be in a small piece of silicon five years from now -- pentaflop, [exaflop]. We're going to see that continued expansion of capability.

Ten years ago we were saying, “Golly, we have a vision for the future. We're going to have a billion people connected to the Internet. We're going to do trillions of dollars of commercial and individual transactions and commerce over the Internet.” And everybody thought

we were kind of smoking dope, I think, at the time we had that vision. Today we've got well over a billion users in the Internet.

The fact is, if you go to China today, not only do you have more kids studying English in China than there are citizens in the United States, but we've got more Internet users than there are citizens in the United States in China today. And we've got about twice that number who have cell phones in China.

So the world has continued to expand technologically at just an astounding rate. And I think you're going to see some more of that today with the technology we bring forward. But I also want to bring back the human element to that.

The human element is really I think perhaps best described by what's gone on in the world in the last decade or two. For a long period of time in the 20th century, since World War II onward, we had three commercial powers in the world -- we had Western Europe, we had Japan and we had the U.S. Competition was very nicely defined between those three geographic areas. A relatively small fraction of the world's population competed against one another, but it was a well-disciplined competition. Everybody had about the same wage rate, same living conditions, etcetera.

Then in the late '80s and early '90s things changed dramatically. The Cold War ended. India and China entered the world's free economic system. The Middle East did as well. Africa started to play. Latin America started to play. Then all of a sudden we had, almost

overnight, three to four billion new participants in the world's free economic system, people with a lower standard of living, lower wage rates, wanting a piece of the economic pie.

And every country that you visit -- and as Pat mentioned, I get to visit about 30 a year -- every place I go I see exactly the same thing. They all recognize that to be successful going forward they have to know, understand and use technology. They have to use technology in education, economic development, healthcare, communicating with their citizens. Everyplace I go you see exactly the same thing, a focus on education, healthcare, economic development. Every nation realizes this is the way to the future. Your future is going to be dependent on the quality of your workforce, the education of your workforce. You've got to have the right environment to invite investment in innovation, to invite investment in development.

There's really only one country -- this is my political statement for the day -- there's only one country that I don't see the same attitude in -- this one, where we don't focus as hard as we should on education, we don't focus as hard as we should on incentivizing investment in innovation. Just the lapse of the R&D tax credit is probably enough of a political statement today, where the government refuses to acknowledge that investing in R&D in the future, the sort of things we do on a daily basis in our lives, is important to the future competitiveness of the U.S.

Everyone else is recognizing that. So, there's this issue of what is the environment for innovation around? What's the right formula to make

your country competitive? What's the right formula to ensure your economic success? And I always come down to that there's three things you can focus on. You need smart people, like you guys in the audience, but good education system; you need smart ideas; you need to invest in R&D.

R&D is the seed corn for new products, new companies, new businesses, new services. It's how you move forward in the world's economic system. And you need the right environment for collaboration to get smart people together with smart ideas to invest in innovation. You need the right tax rate, the right environmental controls, the right regulations, the right rules, things that the government kind of dictates on the business environment.

If you're looking at IT as one of the key aspects of competitiveness, you need a couple of other things, as well. You need access to the technology; you need access to the hardware and software; you need connectivity, because if you're going to use IT today, it's really rich information that flows back and forth between people and corporations and businesses. So, you need broadband capability.

You need content. Frankly, content is one of these localized aspects. If you're in sub-Saharan Africa today, you don't give a damn about what's going on in Wall Street; you care about what's going on locally. You need local content for education, local content for business, for jobs, for employment, for agriculture. You need local content for citizens to interact with their governments. And you also need

education, because you need to know how to use this technology as a tool going forward.

The tech community has a huge role to play here. We collectively are the folks who bring the innovations in software and hardware. We bring the innovations in connectivity. Our software experts, not only here but around the world, bring the local content capability. And we are leaders in showing people how to use the technology, how to educate teachers to use the technology, how to use people to use the technology, so it derives some benefit to the local community.

It really all does start with education. Education is an absolute key, especially if you look at the emerging economies around the world. Eighty-five percent of the young people in the world are not in the established economies; 85 percent are in the emerging economies. These are the developing countries where young people want hope and opportunity, and their only way to get hope and opportunity going forward is through education so they can participate in the world's free economic system.

And despite the challenges you see around the world in countries in terms of living conditions, and fresh water and disease and everything, every country I visit recognizes the importance of education and is striving to raise their level of educational capability. They recognize that is the key to the future.

It's not just about investing money. I was asked recently at an Aspen Ideas Festival if I could only put one piece of technology in a

classroom, just one technological tool to improve education, what would it be? My answer to that group was very simple. I'd put a good teacher in the classroom.

A good teacher is the best tool for a good education that you can get anywhere in the world. If you don't believe that, look at the quality of teachers in the United States, and look at where the U.S. ranks from an educational perspective. It's because we don't have good certified teachers in math and sciences in our public school system.

So, it starts with teachers. It's not throwing money at the problem; it's throwing good qualified people at the problem. Technology helps. It's a great tool. It can enhance education, make kids more interested in learning, etcetera. There's some great work going on with computers, the one-on-one computing profile of one computer per child, stuff that OLPC started, the Classmate PC that Intel brought to the game participates, the inexpensive laptop computers from Taiwan participate today. There's a lot of technological innovation in this space to get more compute capability, more excitement in the education system. But the important thing to recognize, though, is it's a tool. It's how intelligently you use that tool that's important, and that's where the good teachers come into play.

There are lots of other interesting aspects of technology in this space, and there's a lot of innovation that can occur in this space, as well. I want to bring one of these significant bright stars of innovation to the stage, Dr. Johnny Chung Lee, who is an expert in computer/human interface. He's been looking at ways to bring existing solutions into the

classroom to have a major impact on education. Johnny, welcome to the stage. [Applause]

Dr. Johnny Chung Lee: Thanks, Craig.

Craig R. Barrett: Many of you may recognize his handsome face because it's been on YouTube, and you got lots of Web sites showing what he's been doing to take off-the-shelf technology and turn it into interesting educational demonstrations. Maybe you can tell the audience what you've been doing.

Dr. Johnny Chung Lee: Yeah. As you said, I've gotten some attention recently, mostly because I've shown some people some compelling projects they can do at very low cost, specifically using the Nintendo Wii remote. One of the demonstrations I'll show today is how to create a reasonably effective electronic whiteboard system for about $50.

Craig R. Barrett: You're described as a Wii remote hacker, but "hacker" in a positive sense?

Dr. Johnny Chung Lee: Yeah, in a good sense.

Craig R. Barrett: All right. Why don't you show the audience what you've been doing with the device?

Dr. Johnny Chung Lee: Sure, okay. What I'm going to show you is how to transform just a standard piece of foam core into an interactive whiteboard. This is just to represent a standard wall in your office, or

your classroom, or your house. So, I'll just prop it up on the easel. I have this projector here, and a Wii remote sitting next to the projector.

It turns out that the Nintendo Wii remote actually has a relatively high-performing infrared camera in the front of the controller, and that's what I'm going to be using for this project. The other piece of hardware I have are these infrared pens. So, basically all these have is a battery, a button, and an LED.

Craig R. Barrett: You make these things, right? You take a magic marker and turn it into an infrared pen?

Dr. Johnny Chung Lee: Yeah. I pull out the guts, and then I take a quick trip to Radio Shack and then make these. The nice thing is that some students have actually started making these themselves as part of a class project. As a result of the class project, their school now has like 10 or 15 electronic whiteboard systems to use in their classrooms.

Craig R. Barrett: Fantastic.

Dr. Johnny Chung Lee: Yeah.

Craig R. Barrett: Show us how it works.

Dr. Johnny Chung Lee: Sure. What I have running on the screen is a piece of software you can download free from my Web site. What this does is it tells the Wii remote, or the camera in the Wii remote, where the projection display is. So, I push the button at each of these

crosshair points, and now this pen controls the mouse cursor on the screen. I can just operate with any of my Windows programs. I can launch Paint. I can select a paintbrush and draw on the screen.

The nice thing is that if you have educational software you want to use in your classroom, you can use that too. This is a physics software called Phun, P-H-U-N, done as a master's student project by a student in Sweden. What this program does is it recognizes your gestures and automatically inserts them into a physics simulation. What I can do is I can create a couple of blocks. I can stack them up. Let's create a ramp here. Now let's drop a ball on the simulation. There we go. [Laughter] This offer is also free for download.

The other nice thing is that as technology progresses and multi-touch applications become more common, this tracking system also works with multiple pens. Here I can track one pen to manipulate this grid, and then I can track two pens at the same time. So for a very low cost, about $50, you can create a reasonably effective electronic whiteboard system.

Craig R. Barrett: You've made a lot of friends in the whiteboard industry I take it? [Laughter] [Applause]

Dr. Johnny Chung Lee: Yeah, I know. Yeah.

Craig R. Barrett: Well, what you're doing here is you're using existing technology -- and there's really cool technology in the Wii remote, obviously. There's an accelerometer in there, as well as the IR detectors. You're creating

something that's terribly useful. What caused you to get involved? What moved you in this direction?

Dr. Johnny Chung Lee: My background is in interface technology, so exploring new ways that we can interact with technology has been of interest to me. When I saw the technology that's in the controller, I saw a simple opportunity to demonstrate to a lot of people a very useful application that they could do themselves.

Craig R. Barrett: You've been putting all this on the net.

Dr. Johnny Chung Lee: Yeah, yeah.

Craig R. Barrett: You've had 600,000 downloads of the software which allows you to do this?

Dr. Johnny Chung Lee: Yeah, yeah.

Craig R. Barrett: That's got to have a huge impact.

Dr. Johnny Chung Lee: Yeah. If you search online, you can see lots of students and teachers who are already posting evidence of them using that system in their classroom, or integrating into their own projects.

Craig R. Barrett: You've got 5,000 smart engineer developers out here. You got any advice for them, inspiration how they can do stuff that's this cool?

Dr. Johnny Chung Lee: Yeah. When I give this presentation to students, I usually give them two pieces of parting advice. One is to always document and share your work, even if that sounds obvious. If I had done these projects by myself in my lab and didn't tell anyone, no one would know who I was, and no one would have an opportunity to benefit from this technology. So, sharing is almost as important as doing it.

The second piece of advice is actually not to become overly obsessed with performance. Sometimes to be interesting today, technology has to be the fastest, the best, the brightest, the lightest. But here, you actually can see if you sacrifice a little bit of capability and performance, for dramatic savings in cost, you can have a pretty large impact.

Craig R. Barrett: You've done fantastic work, and our hats are off to you. Congratulations.

Dr. Johnny Chung Lee: Thank you very much.

Craig R. Barrett: Thanks, Johnny.

Dr. Johnny Chung Lee: Thank you. [Applause]

Craig R. Barrett: You notice, we even have a low-cost switch on the projector. It's called a black cloth that just lays over the front of the lens. [Laughter]

Well, there are other ways you can use the technology. One of the biggest issues around the world is economic development. If you look at economic development in the emerging economies, most entrepreneurs are not as technically sophisticated as Johnny is. Most of them have ideas of how they can create businesses. But what they need to do to create their businesses is they need some financial backing. If they get the financial backing, they can be entrepreneurs, they can generate wealth, they can raise their family out of poverty.

Perhaps the best example of this is Mohammed Yunis in Bangladesh with the phone ladies where Grameen Bank and Communications Company worked with local women in remote villages to give them cell phones and let them become entrepreneurs to raise their standard of living, raise their capability. That sort of micro-financing got Yunis the Nobel Prize in 2006.

But there are lots of people that are working in that general area today, and there are lots of people that are fostering economic development and using technology to make that happen. You can go online to two places -- onlinevolunteering.org, handsonnetwork.org, ashoka.org, idealist.org -- there are a number of these outfits that are doing this. And they all have the same philosophy, which is not handing people money and giving them charity, but allowing them to be successful going forward.

I'll give you an idea of the amount of money going into these areas. In 2006, there was over $13 billion in micro-financing that occurred. These are loans which are in the range of 50 to a few hundred dollars.

There's one that I want you to look at in particular today, and that's called Kiva. Kiva is an online financing organization that makes about one loan every 30 seconds or so. The average size of these loans are about $500. Weekly they've got something like 10,000 lenders and over $700,000 of funding which goes to 1,500 entrepreneurs.

I want to show you just a quick video which gives you an idea of what Kiva is and what they do.

[Video plays]

Craig Barrett: Will you please welcome Matt Flannery, who's the CEO of Kiva? Matt, welcome.

Matt Flannery: Hi, thanks for having me.

Craig Barrett: Now, Matt, I know that Kiva's a Swahili word. I only know one word in Swahili, which is, last year in August, when my wife and I were climbing Kilimanjaro, our guide kept saying [poley], poley, poley, all the way up the mountain. And you can tell the audience what poley means.

Matt Flannery: It means take things slow.

Craig Barrett: Go slow, one step after another. But what's Kiva mean?

Matt Flannery: Kiva means unity in Swahili, so it's all about bringing people together across borders, across economic spectrum, unifying people here in the

United States and in Europe with people in Africa and South America through lending, not just donating.

Craig Barrett: And how'd you get involved in this Kiva activity? I mean, what's the history behind it?

Matt Flannery: Poley, poley, little by little. I went to Africa on a volunteering mission. I was a software engineer back in 2004. And I took some time off; I was a little tired. I took some time off to volunteer in microfinance in Africa. I'd seen and read about Dr. Yunis's work, and I was inspired to go find out about it for myself.

Craig Barrett: And you created this entity. What's the biggest challenge in deciding you're going to create a micro-financing network?

Matt Flannery: I think the biggest challenge was just convincing people that low-income entrepreneurs all over the world can actually pay back loans. We tend to think of the bottom of the pyramid as people that deserve our pity or people that deserve donations. But, in fact, most people at that stage are actually starting businesses that are quite profitable and quite successful and have high repayment possibilities.

Craig Barrett: And you're making a loan every 30 seconds or so. Most of those loans go to women, I think?

Matt Flannery: Right. About 75 percent of the people on our site are women, and women happen to pay back at extremely good rates and spend that money to help their families, send their kids to school.

Craig Barrett: And you're using the Net to make this happen. I think that's the unique aspect. I mean, you've basically created a network connecting the established world economies with the economies in need, people in need.

Matt Flannery: Exactly. We sort of took the movement of microfinance, which was an offline movement, and tried to take that online for the first time. We tapped into organizations in over 40 countries to put the borrowers and the loans on the Internet. And [what we see] is hundreds of thousands of people on the USA, Europe, Japan, are lending money every 30 seconds to these people.

Craig Barrett: Now, you kind of need the Net at both ends of this, because the applicants have to have accessibility, so you need hardware, software, connectivity tools in Kenya, Uganda, Tanzania, wherever you're doing this activity, right?

Matt Flannery: Yes, and that's been our biggest challenge. Connectivity. In Uganda, when we were starting, the power was off every other day, so you sort of have to go at the pace of the developing world sometimes when you're uploading thousands of loan applications to the website.

Craig Barrett: You know, as most entrepreneurs, I expect you got a ton of advice when you were creating Kiva. I don't know if it was good advice or bad advice. But do you have any advice for the developers here and, if they wanted to do something similar to this, how they ought to go about it?

Matt Flannery: I've received a lot of good advice, a lot of bad advice, and a lot of times not taking advice was the right decision, but for me, one thing I've learned is just to take your skills, whether it be engineering skills or software skills, and apply them to something you care about. And most of us can find a way to do that and make a really big impact. And that's what transformed my life.

Craig Barrett: All they need to do is go to kiva.org, they can be instant lenders?

Matt Flannery: Yes. There's Wi-Fi in this room. You can make a loan right now. But I suggest paying attention to the keynote first and then make a loan.

Craig Barrett: Make a loan during the break.

Matt Flannery: After.

Craig Barrett: Congratulations on what you've accomplished.

Matt Flannery: All right.

Craig Barrett: As Matt said, you need connectivity and tools at both ends, and that gets back to this issue I mentioned earlier. You need to have the capability -- you need the hardware, software, the connectivity, the content, the education of how to use this.

Kiva works in 40 countries. One of the beauties of this system is that although they accept applications only in English, they've got people

who come in on a daily basis and translate from every odd language in the countries they operate into English, to make the applications fundable. It's all done online, using existing technology, helping thousands and thousands of people every year rise out of poverty. It's the sort of thing we can collectively do more of.

But if you talk about connectivity for a second, there's a lot of excitement in broadband wireless connectivity. We've got Wi-Fi in the room. I wanted to just give you a quick update on WiMAX. Kiva was started in Eastern Africa, in Uganda, Kenya, Tanzania, that area. If you haven't been to Africa recently, you'll see that it's coming out of the dark ages. There's a lot of wireless capability there. And the fact is today you can hardly find an African head of state who doesn't know how to spell WiMAX and use it in a positioning speech about where their country is going in the future.

We all know that WiMAX performs significantly above the current 3G solutions. It's cost-effective, you can get the CPE devices now for less than $75. You've got hundreds of companies participating in the WiMAX forums, 60 or so companies making WiMAX clients, chipsets, every major TEM is manufacturing WiMAX-capable gear. We should see 50 million people reached by WiMAX coverage by the end of this year. And within three or four years, 2011/12 timeframe, there should be over a billion people on the planet who are covered by WiMAX capability.

It's that sort of technological advancement -- the sort of things we do as an innovation community -- that helps people around the world join

our free economic system and allows them to have hope and opportunity going forward for their businesses, for their kids, for their future.

Another area that's really important is healthcare, and healthcare's important not only in the emerging world but it's important in the established economies as well. If you look at the U.S. as a great example, we spend over $2 trillion a year on healthcare, $2 trillion, 16 or 17 percent of GNP.

There's a recent article that came out, said we should relax because healthcare is only going to go up by about 10 percent next year in cost. I don't know if any of you have done the computation recently of how much we spend in Iraq or how much the difference between a $50 barrel of oil and a $100 barrel of oil, $150 barrel of oil, but a 10 percent increase on a $2.2 trillion healthcare cost wipes out both of those other issues. And healthcare is a compounded annual increase in cost. The U.S. probably can't afford to spend any more.

The U.S. is not alone in this respect. Every Western European country, Japan, etcetera, all looking at baby boomers getting old. We're going to have well over a billion people over 60 in the near future. Chronic illnesses are increasing around the world. All of this is adding to the healthcare cost for the established economies. So they need tools and technology to attack this issue.

The emerging economies have a slightly different problem. How to deliver healthcare cost in countries where there's no or limited

communication infrastructure, a limited amount of healthcare personnel. How do you make telemedicine work? How do you make it easy for people to get in front of doctors either virtually or physically to get the healthcare that they should have?

So IT can play a huge role in healthcare, transforming the way healthcare is delivered. There's a very simple way to look at the way healthcare is delivered today, say in the United States. And I like to compare it to the computer industry of old.

Our healthcare system today is a mainframe computer equivalent. The mainframe computer is the hospital. You get sick, you go to the hospital. What we really need to do is to bring the personal computer to the healthcare system, such that you don't have to go to the hospital to get care, you don't have to go to the hospital to get diagnostics, you don't have to go to the doctor's office to communicate with the doctor. You can use technology to solve all of those problems.

Your trivia question for the day is what piece of electronic equipment invented 135 years ago, if a doctor uses it today in conjunction with Medicare, Medicaid, can the doctor not be reimbursed for use of that equipment, which was invented well over 100 years ago? The answer is a telephone.

So when I'm talking about using technology to transform healthcare, let's start with a telephone, and then we can get to the Internet and computers and that sort of stuff. The next time you see your local congressman or senator or anybody running for president, ask them

why the hell you can't use a telephone to communicate with your doctor and the doctor get reimbursed for providing that medical care cost -- one simple way to move forward.

But technology can be used to provide a nice proactive, holistic, end-to-end solution to healthcare and probably help contain runaway healthcare costs and provide a social network.

What I want to do next is show you a very simple example of what can happen in healthcare records. You know, and how can we make healthcare records readily available to people? And so what I want to do is invite [Dr. Miguel Angarita], who comes from Colombia, South American country, Miguel, come out and join us --

Miguel Angarita: Thank you.

Craig Barrett: This is a real doctor. Medical doctor -- radiologist, right?

Miguel Angarita: Right.

Craig Barrett: But working for a group called [Groove Media Technology], and tell the audience a little bit about what Groove Media Technology is trying to do.

Miguel Angarita: Sure. Groove Media Technology is a leading company that loves innovation. So I have to say that I'm more than pleased to show you a couple of the products that we are working on for our customers.

Craig Barrett: Okay. One of the things you do is you provide medical information to consumers.

Miguel Angarita: Yes.

Craig Barrett: And another thing you do is you kind of have a portable health record, right?

Miguel Angarita: Right.

Craig Barrett: And can we demo that health record?

Miguel Angarita: Sure, sure. So let's pretend that you had an accident in Colombia.

Craig Barrett: Okay, I was riding my motorcycle from Medellin to Bogotá.

Miguel Angarita: Right.

Craig Barrett: All right. So I had an accident.

Miguel Angarita: And [unintelligible] lying on the ground.

Craig Barrett: Okay. I'm lying on the ground.

Miguel Angarita: Then I came upon you and take the ID card, the health card.

Craig Barrett: I just have enough strength to give you my ID card.

Miguel Angarita: Okay. So the only thing that I have to do, using a regular cell phone with the camera is taking the barcode, which contains all the basic information of you, then it will be displayed at the site of the accident right away. So the only thing that I need to do is review your pertinent information over there. There is also a button, it's called the alarm button. When I click on it, I can send right away an alarm to your primary care physician worldwide.

Craig Barrett: So this has my basic medical information, it has the ability to alert my primary care physician and transfer my medical records to wherever I might be.

Miguel Angarita: Perfect.

Craig Barrett: The same way I can go to an ATM machine in Bogotá and get money, now I can go to Bogotá and maybe get my healthcare information.

Miguel Angarita: That's right. By the way, I just clicked the send button to your primary care physician, which is located in India, so I guess that he must be [unintelligible] [at that hour,] so you should talk with him.

Craig Barrett: All right, all right. I'll talk to my Indian guy in just a minute, but I want to hear one thing from you. What got you involved -- why healthcare? What's the object here?

Miguel Angarita: Well, the thing is that a simple [DSR] [unintelligible] [powerful] and healthcare is not as safe as it should be. Then we thought that we can close the gap between preventable medical errors and the exponential

growth of medical mobile technology. This is why we're working on these kind of solutions.

Craig Barrett: Great. And I wish you the best of luck in getting this adopted by the rest of the world. We need it here in the U.S. You need it in Colombia. We need this sort of technology everywhere.

Miguel Angarita: Thank you very much.

Craig Barrett: Thanks, Miguel. Okay, take care. Well, my primary care physicians, I have two of them, [Dr. Balaji] and Dr. [Rom] are in Andhra Pradesh, India, 2,000 miles away, and they just got my health record. And, doctors, am I healthy? What do you think?

Dr. Rom: Hi, Craig. Yeah, I think you're doing great, Craig. Maybe you should do some exercise regularly.

Craig Barrett: Yeah, I keep hearing that, I know. I'll get onto that part.

Dr. Rom: And about your ECG, I think it looks a little unromantic. You should improve [on the romantic side of this].

Craig Barrett: I'll have to talk to my wife about that. Okay. So a little bit of exercise would help that part of my life, no doubt. Turn that monitor around. I see -- can you turn the screen around? There's something on the back side of that screen. Yeah. HMRI, Health Management Research Institute. Can you tell us a little bit about that? This is really a public/private partnership where the private sector, through some

donations of Satyam Computer, is in fact supplementing the healthcare provided by the government. Can you tell us a little bit about that?

Dr. Rom: Yes, Craig. I'll pass on the mic to the CEO of HMRI, Dr. Balaji.

Dr. Balaji: Good morning, Dr. Barrett. Before we talk [a little bit of HMRI] and what our vision and mission is, I thought I should share a little about the challenges that we face in a state like Andhra Pradesh in India. Andhra Pradesh has about 80 million population, almost the size of Germany. And like everywhere in India, about 20-25 percent of the people live in urban areas and the rest of them live in rural areas.

We have a challenge in the sense that we do have a shortage of doctors. And added to this problem, 80 percent of these doctors live in urban areas. And only 20 percent of them live in the 200 towns. And some of them move to another 1,500 towns. So net-net, all of the doctors are concentrated in just about 2,000 towns. And Andhra Pradesh has something like 80,000 habitations all around.

So the challenge is, how do you deliver healthcare to people where 80 percent of them live in rural areas, and then the doctors are only in 2,000 towns? We found that the best way of solving that is to use technology. We do leverage technology in multiple ways. Like there's a saying that goes around here: If you've got a hammer, everything looks like a nail.

We bring in technology. And then to begin with, we have set up a world-class contact center where people can call a toll-free number

called 104. And around the clock there are doctors and paramedics available. And there are clinical psychologists available to consult people online.

And also, we have a repository of all the health information that people need -- where are the doctors, where are the paramedics, and where are the diagnostic centers, and so on. So just by a phone call, people can do this. And this would not have been possible 20 years ago.

Today, Andhra Pradesh has something like 20 million phones, all of which, almost 15 million phones, are mobile phones, and the numbers are growing dramatically. So we think that this telecom revolution is helping us in delivering low-cost, high-quality standardized healthcare to the poor at their fingertips.

This is where we have been so far, and we will journey to go further. We're about to launch a last-mile delivery to the doorstep of our villages, drugs and diagnostics at the doorstep. We have been working on deliveries, but currently the challenge is we are working on a [store-and-forward technology mode], which should be able to do that.

For us, this looks more like a classical problem of disaggregated demand dispersed around 80,000 locations, but the supply is in few locations. So we thought the glue that can connect up all of this is technology. And part of that is a world-class contact center, and we propose to work with a lot of [companies] and [unintelligible]. So we're looking forward to taking that forward.

Craig R. Barrett: It sounds very exciting. You've got a 104 number, which, for the people in the audience here, is a little bit like 911. You can phone 911. There you phone 104. You can get medical advice. They have another number which is 108, which is emergency medical advice.

And as the doctor was mentioning, the plan is now to expand that capability with higher bandwidth solutions so you can start to get real-time emergency images, feedback, diagnostic information from the patient back to the urban centers where the doctors are. I think this is a wonderful example of how technology, in a very simple sense and then building on our capability, can provide better healthcare to citizens in India.

Let me give you my compliments, gentlemen, on what you've accomplished. And as I want to just tell the audience here, this is, in fact, one of the first WiMAX deliveries to India. It's not WiMAX at this end, but it's WiMAX for the last few kilometers at that end. The Indian government has approved this technology for use and licensing and we hope that it will be rapidly expanded in the medical community. Thank you, gentlemen, from India.

[Applause]

You know, there are lots of other areas we could talk about. We could talk about the environment. The ICT community uses something like two percent of the world's energy. The important thing is it has the potential to impact the other 98 percent of the energy usage.

The bulk of the energy usage, as we all know, is used in energy creation. It's used in energy loss from buildings and houses, transportation, and heavy industry. That's where ICT has a huge role to play. You can do things like UPS has recently done. UPS has --

[Audio gap - static]

-- impacted their delivery schedules. They're able to save basically three million miles a month just by this simple use of technology to do that.

There are lots of other examples where tech can play a big role. One is, in fact, in energy creation, alternative energy. If you start to look at solar or wind power, technology plays a huge role here in the solar area, its efficiency and distribution capability. IT plays a huge role in that.

The importance here, though, is if you're going to solve these problems in energy, it, in fact, goes back to education as the primary role.

And what I want to do is, for my last visitor on stage, is bring out one of our future engineering scientific stars. You know, nations are as strong as their education system. And in the U.S., we've had a pretty good university education system. We're struggling a bit in K through 12. One of the things Intel has been sponsoring for the last decade or so is something called the Science Talent Search. It's kind of the junior Nobel Prize for high school kids in the United States. Westinghouse

sponsored it for the first 50 years. We've sponsored it for the last 10 or 11.

I want to bring one of the finalists from this year's STS out, Brian McCarthy from Oregon. He's the third-place winner. He lives in Hillsboro, Oregon. Brian?

Brian McCarthy: Good to see you.

Craig R. Barrett: This is the next Michael Phelps of the technology industry, folks. He's only about to go off to college, but he has a great future. And there's a certain similarity -- smile for the . . . But tell the audience, you've done a project for the last couple of years serious enough to get into STS, serious enough to get third place. What was the project?

Brian McCarthy: I was working at Portland State University in Portland at a lab of Dr. Wamser. And that lab works on plastic solar cells. So instead of using silicon, which has been traditional for a long time, we were working on using plastics. The idea being that if we can make solar cells out of plastic, we can make them as widely available as plastic is today and hopefully bring down the cost and make them much more feasible and reduce our dependence on carbon-emitting energy sources.

Craig R. Barrett: And how did you get involved in this project in the first place?

Brian McCarthy: Well, it started a long time ago, my interest in science. My brother and I were always playing in the mud and making dams when we were very young. My parents encouraged this. I don't really know why; we

made great messes. But I eventually had some great teachers, especially in eighth grade. One of my science teachers encouraged us, me and a few other students, to do a science fair project.

And that continued into high school. And eventually, in my sophomore year, I had a great physics teacher who got me an internship at Portland State and I started working on this project. And at this point, I really had no idea what I wanted to do. And it was through that project that really showed me how exciting it was to be on the cutting edge of science to develop these kinds of things. So it was that experience that led me to come back the following summer and continue working on that. So it was kind of the experience that helped me get into it.

Craig R. Barrett: Sometimes it seems like in everybody's career there's a mentor or somebody that really influences their life's direction. It sounds like it was your teacher in this case.

Brian McCarthy: Yeah, I've had my teacher and quite a few other mentors.

Craig R. Barrett: Well, you know, we have a lot of discussion, Brian, in the U.S. about the deficiencies of the K-through-12 education system in math and science. You're in it, or you're just out of it now, but you've gone through that system. Do you have any advice for us adults in how to behave in an adult fashion as we go back and try and create an environment which will get more kids interested in math and science like you?

Brian McCarthy: Definitely. You know, you read in the newspapers these days about how our math and science scores are down compared to the rest of the world. And I think we are focusing a little bit too much on our science scores. Because in reality, no student is going to be all that excited about taking tests. And it's not that experience that's going to get them into science or math or engineering.

They need to have the opportunity to do these things, have internships, to have after-school programs. That's really going to get them into the fields that you all are in. So unless we change our perspective, I don't think we're ever going to see that shift in a positive direction.

Craig R. Barrett: Well, and I think this requires something. As I was talking about earlier, it requires good, qualified teachers. And it requires the capability in the classroom to get hands-on experience to see what engineering and science is all about.

Brian McCarthy: Right.

Craig R. Barrett: Well, I want to congratulate you on what you've accomplished. And before you go off the stage, I want to give you a little remembrance of what happened. And this is just a framed photograph with the three finalists at the STS award this year. Handsome young man on the right-hand side, congratulations.

Brian McCarthy: Thank you very much.

Craig R. Barrett: And even though you're going off to MIT and not Stanford, I wish you success in your future.

Brian McCarthy: Thank you very much.

Craig R. Barrett: All right.

Brian McCarthy: Thank you.

[Applause]

Craig R. Barrett: My main job for John Hennessy each year as I go back to the STS finals, I try to recruit the top 40 finalists to go to Stanford. Every once in a while, one gets away. What can I say?

[Laughter]

You know, the ideas are here to do the sort of things we've been talking about. And the ideas are with you in the audience and the whole development community. There's such an immense amount of technology that can do so much good around the world.

And what we need to do is just have more examples of what Johnny Lee is doing or Matt Flannery is doing or the sort of things that you can do around the world. And partnerships are the key to make this happen, public-private partnerships, partnerships between different technology companies, and the creation of ideas.

I want to leave you with one simple thought. I was at the world conference on IT in Kuala Lumpur earlier this year. And I went back to my hotel room at night. And, you know, they always put a little piece of candy on your pillow or something. And sometimes, there's a thought for the day on your pillow as well.

And the thought for the day before I gave my keynote the next morning was very simple. It said, "A small deed done is better than a great deed planned." And we collectively have the opportunity to do a bunch of great small deeds. The deed that Johnny Lee showed you with him taking that Wii remote and turning it into an intelligent white board, Kiva micro-financing using technology, medical records, education, lots and lots of examples.

So what I want to do is leave you with a very simple thought, opportunity. What we want to do is to announce a challenge for the developer community today. And the challenge is very simply this. I want to make four $100,000 awards at the spring IDF next year in the areas of education, health, economic development, and environment.

If you go to intelchallenge.com, and those of you who came in, you should have found a little card like this on your chair, and it tells you where to go, intelchallenge.com. We're going to give four $100,000 awards for the best innovative idea. We want to innovate, we want to inspire, we want to empower people around the world with technology in the four areas that I've mentioned: healthcare, economic development, education, and environment. Sustainable ideas, but ideas using technology to really help people go forward.

So if I can encourage you to do one thing as you leave here, get on the wireless network, go to intelchallenge.com, apply for one of these awards. We'll have an independent judging panel and four $100,000 awards. The money doesn't go to your personal banking account; the money goes for the implementation of the idea. So don't get ideas of being instantaneously rich with a good idea. We want you to really do something. But work on it, have fun. Enjoy the rest of IDF. Thank you.

[Applause]

[Music]

[End of Recorded Material]