

REMARKS BY GEORGIA TECH PRESIDENT G. WAYNE CLOUGH
ODK Leadership Conference, January 27, 2007

- Thank:
 - Phil Thompson for introduction
 - Dustin Hipp of ODK for invitation
 - ODK for long tradition of leadership on campus; GT chapter founded 1930, started annual leadership conference in 1983; were ushers at my inauguration.
- Theme of this conference: “Pursuing Your Vision with Passion.” Dustin asked me to talk about:
 - What “vision” is.
 - How I developed a vision for Georgia Tech.
- What is “vision”?
 - Webster: Several definitions, including hallucinations, but 2 are pertinent to today: 1. the physical act or power of seeing; 2. an object of imagination or mode of conceiving.
 - #1: literal ability to use our eyes, is important part of vision.
 - Ralph Waldo Emerson: “What is life but the angle of vision? A man is measured by the angle at which he looks at objects.”
 - What we literally see around us is the starting point for vision.
 - #2: ability to imagine and to form a conception in our minds of how we think things could be or ought to be.
 - The talent of an innovator is to look at the same things everyone else sees, but at a slightly different, more imaginative angle, envisioning how they can be used in new and different ways
 - Similar to innovation, vision means seeing what is literally around you and imagining what it could become if its full potential were realized.
 - Vision statement = an image of the future we seek to create
- Characteristics of vision:
 - **Rooted in larger ideals, principles that govern right action:** U.S. Senate always opens the day’s session with a prayer. On April 18, 1947, Senate Chaplain Peter Marshall: “Give to us clear vision that we may know where to stand and what to stand for – because unless we stand for something, we shall fall for anything.”
 - **Shared:** If it just belongs to you or is about you, it is not vision but infatuation. Vision serves a greater good and must be embraced by those within the circle of that greater good.
 - **Dual nature:** Greeks, Romans provide an illustration. Classic historian Ralph Westwood Moore: “The Greek saw life steadily and saw it whole; the Roman saw it steadily, but his vision was strictly limited, and it did not occur to him to ask whether he saw life whole. He saw life in terms of action, and action in terms of his own needs.” Fortunately, Greek idealism guided Roman realism. Roman

action was inspired by Greek vision. Vision needs both idealism and realism. On one hand, we need to be able to rise above our own infatuations to the 30,000-foot level, see the big picture, and envision what can be. On the other hand, within the context of that big picture, we also need to be able to see ourselves down below on the plain, engaged in the practical reality of realizing the vision and follow through with action.

What do we see today when we look at the big picture?

- **Challenges:**

- **People:** Took all of history until about 1825 for world population to reach 1 billion. When I was born in 1941: 2.3 billion. 1960: 3 billion. 2000: 6 billion. UN projects for 2050: 9 billion.
- **Needs of population:** How to feed, house, incorporate into economy? Atlanta's transportation issues one small example of the challenge.
- **Fresh water:** Most pressing problem of 21st century. One in 5 people don't have access to safe drinking water; one in 3 do not have enough water for proper hygiene. Not just an issue for poorer countries – water is even a problem here in Atlanta.
- **Climate change:** Huge ice shelves breaking free in Arctic, Antarctica. Last week: 2006 reported as hottest year in U.S. history. Rhythms of eco-systems disrupted (polar bears losing ice habitat; bird migrations getting out of sync with insect availability) and new weather patterns are emerging. Carbon is being pumped into our atmosphere at a growing rate with the continued reliance on carbon based fuels. Not only contributes to global warming, but haze of pollution from carbon-based fuels has reduced the crop yield in China by one third because sunlight is obscured.
- **Growing disparity between the haves and the have-nots:** Unfortunately, even have-nots may now have access to weapons of mass destruction. And many countries in the developing world subject to recurring wars do not have access to the basics of life, including water and sanitation.
- **Health epidemics:** Lack of clean water; encroachment on animal habitat – AIDS virus made the jump from apes to humans; bird flu from birds to humans. Modern transportation enables disease to spread very quickly.
- **Quickening of the pace of change:** Many technologies that we can take for granted today, are actually quite new. 25 years ago (when your parents were your age): no iPods, Blackberries; \$4,000 bought a computer with no hard drive, 9-inch monochrome text-only display; clunky walkie-talkie devices instead of cell phones; no digital cameras; no Internet.

Looking back in history we learn that 4,000 years elapsed between the invention of wheel and the first wheelbarrow; 100 years between patent of steam engine and its commercial application in boats and trains. Things moved slowly.

Reason: poor communication meant scientists, inventors worked in isolation.

Today: Internet – know everything almost instantly (600 billion web-pages created since commercial Internet began decade ago – 100 for every living person on Earth.) Imitators quickly enter market, making it very competitive.

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- The same technology that picked up the pace of change now connects people in a global economy. Tom Friedman described what the Internet is doing as “flattening the world” – leveling global economic playing field
 - Allows emerging nations with large populations (China, India) to compete with the United States in our favorite high-tech economic space.
 - Of course, not long ago, China and India were known as countries with unskilled, cheap labor. Now China, India are focused on developing world-class universities – educating skilled workforce, conducting research. Graduate more engineers scientists than United States.
 - Formula that drove the U.S. economy over the past 30 years = outstanding research universities + skilled workforce + large market for technology + pushing the pace of technology change. Today others are emulating us, and we are seeing multinationals put R&D labs, production facilities in China, India to access growing talent pools, growing technology markets.
- On the other side of the ledger from emerging challenges, **tremendous and exciting opportunities:**
 - **Environmentally sustainable technology**, infrastructure: Desperate need for it around the world.
 - **Alternative sources of energy:** Biofuels, wind, solar. Improved forms of nuclear power. New approaches that reduce demand for energy like solid state lighting.
 - **Nanotechnology revolution:** Flexible digital display that rolls up like windowshade; tiny nano-devices that can be injected into human body to diagnose, treat disease, correct genetics; building materials lighter than steel, 10 times stronger. The broad impact of this field is one of the reasons Georgia Tech is building one of the world’s leading edge centers for research into nanotechnology and hiring some of the brightest faculty who work in this area.
 - **Cusp of a new age of medicine:** More predictive and customized to each person, less reactive and invasive. Partnership with Emory enables Georgia Tech to be a leader.
 - **New high speed and miniaturized computing and storage tools:** Fastest chip in world developed by Georgia Tech and IBM researchers. Headed for storing Library of Congress on a device the size of a sugar cube.
 - Although we face growing international competition, **large markets are opening for our goods** and services in the same nations that are competing with us. And it is no wonder we are interested in them – if the world’s population in 2025 were reduced to 100 people, 56 would reside in Asia, 6 in the U.S.
- Our future will depend on how well we orchestrate our human, financial, and natural resources to meet the challenges and prosper this larger context. Will require innovation.

- Innovation is more than invention of technology. It exists at the intersection of invention, ideas, insight, imagination, and implementation in the real world.
- We must not only create new technology, we have to use it in positive, creative ways to solve problems, improve the quality of life, and protect our environment.
- This is the context for developing a vision for Georgia Tech. Where does GT fit in this picture? What is our responsibility, our contribution to meeting the challenges, shaping a positive future in the way we educate students, conducting research, helping to drive high-end economic development?
 - Suspect this group is most interested in educating students, so I will focus on that piece of the vision.
 - Chaired an initiative of the National Academy of Engineering called the Engineer of 2020. Two phases: Phase I (Greek): envision future and the role of the engineering profession in that future; Phase II (Roman): figure out how to prepare engineers to play that envisioned role and serve the needs of the future.
- Strategic Planning:
 - One of my first undertakings as president: **1995 Strategic Plan**. “The Vision: Georgia Tech will be a leader among those few technological universities whose students, alumni, faculty, and staff define and expand the frontiers of knowledge and innovation. Georgia Tech seeks to create an enriched, more prosperous, and sustainable society for the citizens of Georgia, the nation, and the world.”
 - From that vision, developed mission statement, goals, and agenda to realize goals.
 - Envisioned as 10-year plan, but we discovered at the end of five years, we had achieved much of agenda
 - **2002 Strategic Plan**: Sharpened and extended the focus of our vision: “Georgia Tech will define the technological research university of the 21st century and educate the leaders of a technologically driven world.”
 - Developed a mission based on that vision statement; took note of the challenges and the strategic advantages we had in meeting those challenges.
 - Reinforced our core values of leadership, a global perspective, the social and human context of science and technology, and communication.
 - Then set our goals and outlined the tasks that would enable us to meet those goals.
- Both plans had as goal #1: Student-focused education. GT’s challenge: educate innovators who will:
 - Succeed and thrive in a global economy where new approaches are the key to achieving success.
 - Seek solutions to improve the environment while maintaining a strong standard of living.
 - Understand the impact of their choices and be prepared to choose humanely and well.
- This means for us at Georgia Tech that we need to educate our engineers, scientists and business people more broadly than in the past. They need to:

- **Understand social impact of technological developments** – technology and social change are a double helix – 2 strands inextricably woven together. Environmental issues: need engineers at public policy table to break the deadlock between preserving the environment and promoting economic growth with sustainable technology. Policy makers also need help to understand disruptions, problems technology can cause; and address up front. That is why at Georgia Tech we have a nationally ranked program in public policy both for our majors in policy and our students in engineering and science.
 - **Appreciate the importance of convergence.** E.O Wilson: consilience = in the complex ecosystem of our world, there are basic, underlying, governing principles. Practical e.g. Computing is a tool with wide variety of applications that should serve to merge fields. At GT: humanities + computing = digital media; music + computing = Haile, the robotic drummer; mapping of human genome + computing = bioinformatics.
 - **Be able to work in teams that cross disciplines:** Hot spots for innovation in spaces between traditional disciplines, fields of study. Eg. Systems biology, foundation of next revolution in medicine, brings together biology, chemistry, computer science, math, physics, and applies to medicine.
 - **Have the ability to think critically, creatively:** Define what the problems are rather than simply applying rules or formulae; look at things differently and see what others do not.
 - **Link issues creatively** – i.e., artists who can think like engineers and vice versa; GT's Ivan Allen College of Humanities – unique technological perspective on the arts.
 - **Learn to be citizens of the world:** Appreciate history, origins of culture. Understand dynamics of global economy; comfortable with cultural diversity
 - **Become leaders in the best sense of the word.** Be passionate about a worthy cause that is bigger than yourself and become a servant to its realization.
- To achieve these goals, GT must be innovative in the educational experience we offer. So we are:
 - **Changing the curriculum:** “Threads” tie computer science theory to practical application in broader world; “roles” envision career opportunities. New degrees in digital media
 - **Encouraging undergraduate research:** 43 percent of undergraduates engage in open ended research, wrestle with problems with no foregone solution in the back of the book.
 - **Expanding international opportunities:** One third of undergrads study abroad; Metz, Singapore provide opportunities for science, engineering majors; dual degree agreements; international internships. Degree programs with international flavor: modern languages + global economics; modern languages + international affairs; global economics + international affairs. Faculty, students tackle projects that assist needy parts of world – helping Angola and Liberia recover from civil war, addressing sanitation in Bolivia, water supply in Honduras, and community development in Ecuador.
 - **Educating both sides of brain:** Expanded programs in music, poetry

- **Opening wide range of opportunities for students** who study engineering, science and business: Recent survey of top professional schools (medicine, law, business): GT is one of top suppliers they look to.
 - **Offering a rich mix of co-curricular opportunities:** Leadership opportunities, leadership certificate program; service opportunities; athletics, concerts.
 - **One of best compliments GT ever got:** Tom Friedman said we know how to operate in the flat world.
- Conclusion: GT's "vision": Be a university that "gets it" to quote Tom Friedman. What that means terms of educating students:
 - Prepare you to live as a whole person in a world shaped by technology. And guess, what – it is a whole lot more interesting and fun than the old way.
 - Help you understand technology as tool; know how technology shapes society and how society shapes technology; anticipate, minimize problems technology can cause.
 - Help you learn how to innovate.
 - Prepare you to live as citizen of global economy – at home with cultural diversity, and willing to tackle tough problems that will improve the life of all creatures large and small on this planet of ours.